OCTOBER 24, 1955

NEWS ISSUE

Electrical World

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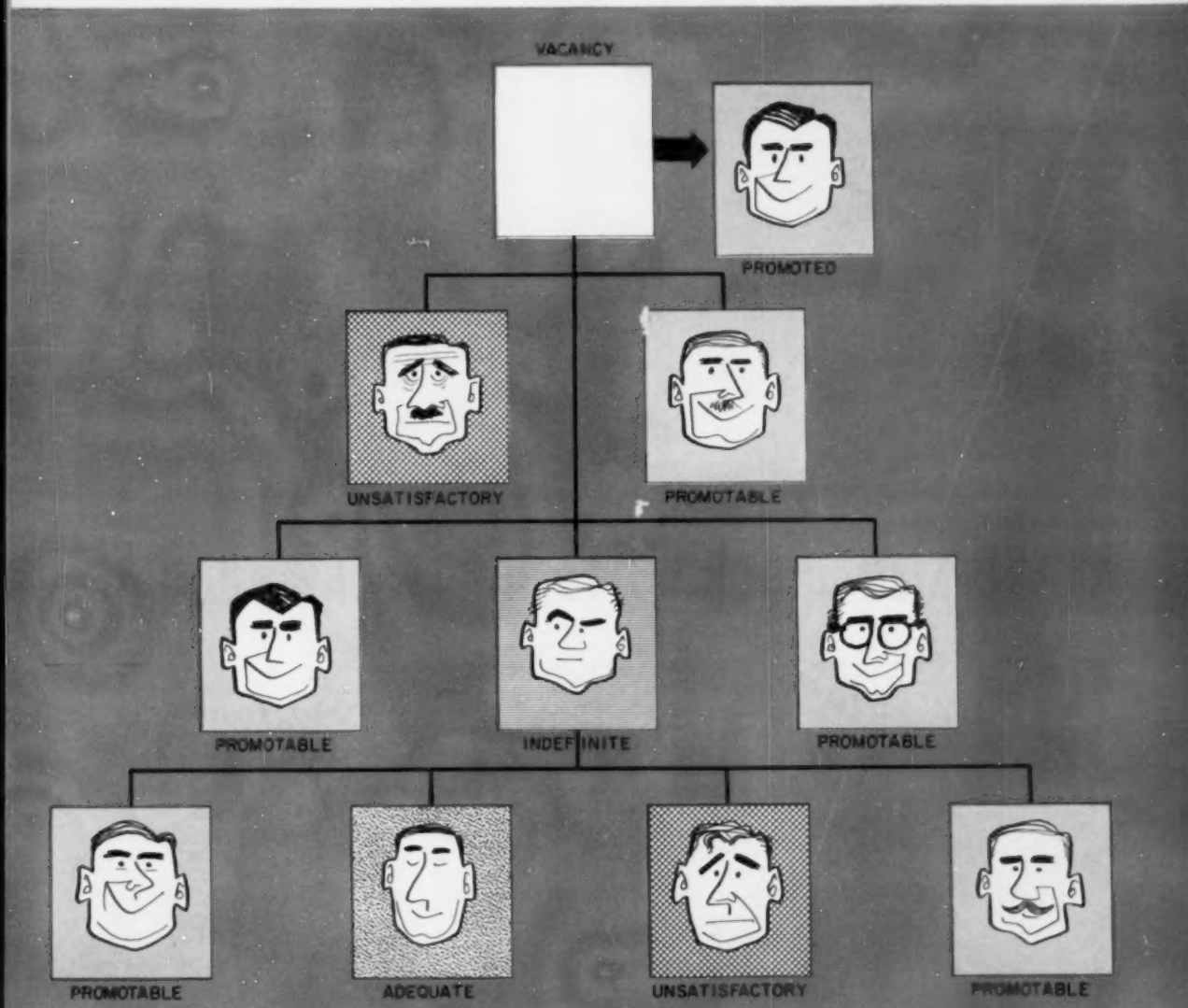

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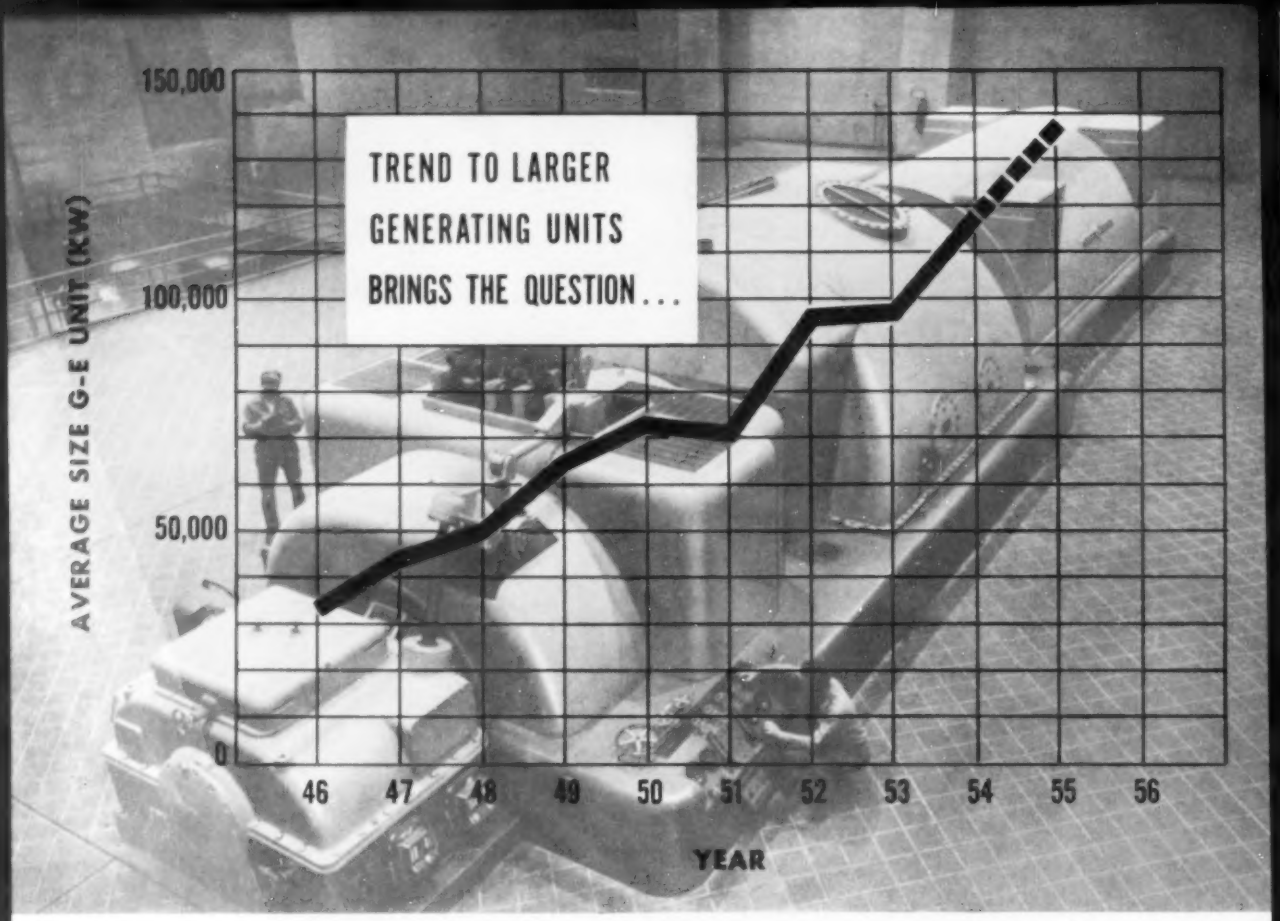

What size machine is most economical?

TREND TO LARGER UNITS, discussed here by A. G. Mellor (right) and Dr. L. K. Kirchmayer, G-E electric utility engineers, is revealed in estimates that average 1955 G-E units will be four times the average size of 1946 units.

Spurred by load growth trends, many electric utilities are now evaluating investment costs, reserve requirements, labor costs, transmission losses, interconnection facilities, and heat rates to determine the best size of generating equipment to meet system expansion.

Application of methods developed in recent General Electric studies to individual systems should help utilities reach the most suitable answer. In general, large generating units are the economical choice.

LARGER UNITS FAVORED

As load growth dictates additional generation, operating economies generally favor the larger units, based on generation costs and manpower requirements. Sometimes investment charges are higher when large units are used, because of increased reserve requirements. However, these fixed costs are often offset by reduced fuel requirements for the portion of the load that the newer unit takes over from older, less efficient machines.

A typical analysis points to units of 7% to 10% of system size as the economic way to add capacity.

500,000-KW UNITS

With G.E. constantly making technological developments, units of 350,000 kw are under engineering consideration and units of 500,000 kw are possible in the future.

If load growth follows today's patterns, large generating equipment may prove extremely rewarding. For more complete information on determining the optimum size of generating units, contact your G-E Apparatus Sales Representative, or write for bulletin GER-1030 to General Electric Company, Schenectady 5, N. Y. 301-284

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• • •

COMING NEXT WEEK—One of the biggest and most unusual lighting jobs in the country is that being installed in the Lincoln Tunnel connecting Manhattan and New Jersey. EW will give the details.

When cemented to caps, top and bottom, this porcelain becomes what is probably the strongest switch-and-bus insulator ever produced.

Illustrated in the production of this unit is a noteworthy and valuable characteristic of the Lapp Post design. The simplicity of the structure, the uniform reliability of Lapp porcelain, and the certainty of cemented caps, instead of pins or inserts, all are such that it is routinely possible to design an insulator into an unexplored strength field. And it will meet specified characteristics, without risk of unknown variables.

In this case, specified cantilever strength requirement was 10,000 pounds. Because time was short, we designed for a generous factor of safety—and obtained all of it. The porcelain is 11½" diameter, 13⅜" high, and weighs a little over 60 pounds. It is, of course, the traditional Lapp Station Post closed end porcelain, with integral top diaphragm.

HOW MUCH STRENGTH DO YOU NEED IN A SWITCH-AND-BUS INSULATOR?

In the Lapp plant, such porcelains as this are almost commonplace. Everywhere you look you will see pieces with the characteristic Post corrugations, in all stages of production, and in sizes for duty over a wide range of voltages and strengths. And every unit will be proved, through extensive testing facilities, to its specification requirements. No where else will you find such emphasis, such devotion, to "difficult" porcelains.

Users of Lapp porcelain—as components of electrical equipment, or as insulators for transmission or station duty—profit, in security, in long life, in low upkeep, from the experience and skill born of such design and production.

Lapp Insulator Co., Inc., Le Roy, N. Y.

EDITORIALS

The Mighty "Preference"

The recently released opinion of Attorney General Herbert Brownell, Jr. regarding proposed sales contracts for power from Clark Hill project must be regarded as a setback for Administration power policy. One effect is to recreate the preference customer as the "dominant customer"—the same position accorded this class by the New and Fair Dealers. Another effect is to ignore other Congressional directives pertaining to disposal of federal power.

"Preference" to us denotes "priority consideration"—not "sole" or "dominate" consideration. "Priority" was the general meaning accorded "preference" in the Republican policy statement issued in August 1953 by the Interior Department and personally endorsed by President Eisenhower.

In that statement the Republican Administration said it would give "preference and priority" to public bodies and cooperatives in sale of federal power. Remaining power was to be sold to electric companies serving rural and domestic customers. Thus an electric company customer had at least a chance of obtaining some small share of the government power which his tax dollars helped to produce.

Now comes Attorney General Brownell (see p 8) to say that a contract with an electric company "would have to contain . . . adequate provision enabling the Secretary to deal with the preference claimant should it subsequently obtain the means to take and deliver the power. It is not necessary for me at this time to delineate the terms of such a provision." The Attorney General goes on to say, "Nor, in the circumstances here present, does the Secretary, in my judgment, discharge his statutory duty of giving a preference in 'the sale' of power to public bodies and cooperatives by disposition to a private company under an arrangement whereby the latter obligates itself to sell an equivalent amount of power to preference customers to be designated by the Secretary."

This interpretation is right in line with the one handed down by the late Harold Ickes in his 1946 memorandum on power. In that statement Ickes wrote: "Contracts with privately owned companies shall be limited in time and shall contain provisions for the cancellation or modification by the government as necessary to insure preference to public bodies and cooperatives."

Besides casting the "preference" customer in a dominating role, both the Brownell and the Ickes statements ignore other equally important legislative directives that apply in the disposal of federal power. These are that the power and energy be disposed of in "such manner as to encourage the most widespread use thereof" and "at the lowest possible rates to consumers consistent with sound business principles."

The Administration power policy applies a more precise meaning to "preference" than does the Brownell and Ickes opinions. This policy also gives weight to other concurrent legislative directives on sale of power. The Brownell and Ickes opinions ignore all but the mighty "preference."

Voltage Dip and Automation

Neither voltage dip nor automation are new. Nor are they necessarily incompatible. Both have existed side by side on power supply systems for years. And within practiced limits, they can continue to do so today in the face of the premium that stepped up industrial automation is putting on higher and higher quality electric service.

But this involves a challenge the electric utility industry should not be forced to face alone. If industries are to enjoy the fruits of accelerated automation, they and the industrial control manufacturers must share the responsibilities by making the design of intricate industrial machines compatible with the characteristics of practical economic power supply systems.

The implications of the situation were made clear at the recent Edison Electric Institute Transmission and Distribution Committee meeting (p 22). C. W. Quick said Detroit Edison Co is being asked by industrial customers for voltage regulation to plus or minus ¾ of a volt and deviations from nominal voltage for not longer than one cycle. This is obviously impossible.

Today even the fastest and most modern power system relays and breakers have combined times in excess of three cycles. On most systems they range from 8 to 20 cycles. Thus it is apparent that from an economic standpoint the duration of voltage dips arising from faults on the system cannot be materially reduced for some years.

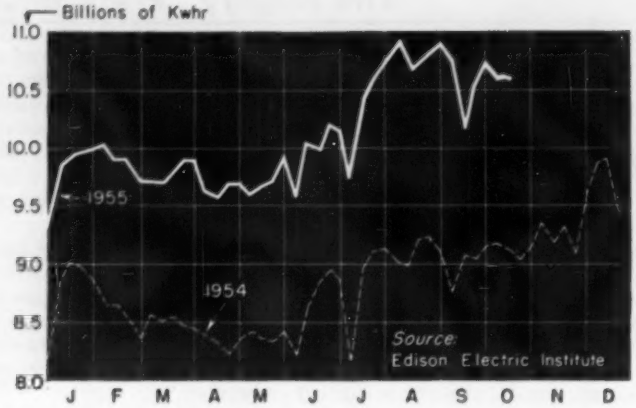
But the trend to automation is strong. Its need for high quality service must be accepted and with it the corollary that what has been highly satisfactory in the past may no longer be adequate.

Detroit Edison's limited study of tool breakage, magnetic chuck release, automatic screw machines, and automatic lathes showed no damage to work or machines with voltage dips of 90% lasting up to 30 cycles. But they found contactor designs with drop-out voltages ranging from 30-50% and drop-out times ranging in some cases from 2 to 12 cycles after drop-out voltage is reached. In one case it was ¾ cycle.

Such contactor and relay drop-out times are obviously incompatible with even the shortest power system breaker times. Drop-out voltages, too, may be too high.

There are signs that control manufacturers are beginning to recognize these conditions. Certainly power system designers can and are working to improve voltage dip, but they cannot eliminate it entirely. Nor can they "go it alone." They need the realistic cooperation of electric power customers and control equipment manufacturers alike if the intricate mechanisms of automation are to live in tune with the practical economic environment that surrounds power system design.

Automation and voltage dip are not necessarily incompatible. They just need understanding.



OUTPUT

Week Ended Oct. 15
10,599,000,000 Kwhr
Up 16.3%

Atomic Energy Commission requirements — 1,025,000,000 kwhr (Electrical World estimate). Excluding AEC, output increase was 10.9%

Per Cent Change From Previous Year

	Total US	New Eng.	Mid. Atlan.	Cent. Ind.	West Cent.	South-east	South Cent	Rocky Mount.	Pacific NW	Pacific SW
Oct. 15	+16.3	+11.0	+8.6	+28.6	+6.3	+19.6	+6.7	+23.1	+9.0	+11.6
Oct. 8	+15.7	+11.3	+7.5	+27.4	+7.2	+19.0	+8.8	+23.6	+7.8	+10.7
Oct. 1	+16.0	+10.3	+7.6	+26.6	+8.0	+19.4	+12.3	+24.0	+10.4	+9.5

Seasonally Adjusted Index 204.2 Week Ago 204.3 Year Ago 175.4

The Issue's Highlights—Chudoff subcommittee hears Interior Department's side in probe of government relations with co-ops with accent on Clark Hill . . . Georgia Power Pres Harllee Branch defends company's position in Clark Hill controversy . . . Details of Attorney General Brownell's proposed Clark Hill contract . . . Floods hit Northeast again . . . Private utilities score proposed New York State St. Lawrence River power contracts and transmission line . . . U. S. Army has built 54,000-kva steam power plant on Okinawa and will distribute power over 69-kv network.

FBI Checks Citizens for TVA, Inc—Thomas P. Wall, Jr, Nashville, Tenn., attorney and unsuccessful candidate for U. S. Senate in 1954, has asked FBI to investigate Citizens for TVA, Inc, to determine whether it is an unregistered lobby in violation of federal law. Said Wall: "I was aroused by a newspaper story I read recently that Governor Clement had contributed $10,000 to the Citizens for TVA from his special emergency fund. I was aroused because I was thus contributing to this private lobby without my knowledge or consent."

Utilities Aid Agriculture—Northern States Power, Otter Tail Power, and two co-ops—Central Power Electric Co-op, and Minnkota Power Co-op—have teamed up in a unique goodwill gesture. The four have given the University of Minnesota's Institute of Agriculture a $100,000, 5-year grant for research in application of atomic energy to agriculture. There are no strings attached or limitations on areas of research.

Niagara Compromise?—John E. Burton, now member but formerly chairman of New York State Power Authority, proposes this compromise as solution to Niagara redevelopment deadlock: Pool both St. Lawrence and Niagara power with existing private, public, and co-op system production into integrated system. Use existing private utility transmission lines. Pass on benefits of lower production costs in form of rate reductions. Still unanswered: Who will redevelop Niagara?

Territorial Exchange—Commonwealth Edison and Central Illinois Light have asked Illinois Commerce Commission approval to exchange parts of their service areas.

Labor—As EW goes to press, strike by IUE-CIO workers at Westinghouse plants continues. Negotiations were still going on at Pittsburgh with the various union groups involved.

NEWS OF THE INDUSTRY BRIEFLY TOLD

Washington Wire—Democrat majority on Chudoff subcommittee voted down proposal to give Georgia Power Pres Harllee Branch chance to state his side of Clark Hill power controversy . . . NRECA, at Washington regional meeting, unanimously passed resolution demanding resignation of Interior Secretary McKay and his top aides from office. Delegates also called for preference for co-ops in distribution of St. Lawrence power and for Congressional passage of Lehman-Davidson bill for state development at Niagara River . . . Puget Sound P&L has asked FPC for license to build 85,000-kw, $27-million hydro project on Upper Baker River.

Northwest Power—BPA has told direct industrial customers it will be able to meet full energy requirements through Nov. 13 because of improved water conditions.

Public Power District—California Water & Power Users Association has scheduled meeting in Oakland, Oct. 28-29, to discuss formation of Northern California Public Power District. District would purchase either power or falling water from proposed $219-million Trinity River Project and would provide supplemental power from steam plants.

Financial and Legal—Central & Southwest Corp has voted to increase quarterly dividend from 33 to 35¢ payable Nov. 30 to record Oct. 31 . . . U. S. Supreme Court has in effect upheld lower court ruling requiring government to make about $6-million tax refund to Ohio Power. Contention upheld is that all of a fast tax write-off certificate issued during World War II could be written off at fast rate instead of only part as authorized by WPB.

AEIC Meeting—Admiral Ben Moreell, chairman, Jones & Laughlin Steel, who headed Hoover Task Force on Water Resources, told Association of Edison Illuminating Companies in White Sulphur Springs: "Only way an advantage can be shown for public power is by subsidizing it. Subsidy is, therefore, a political necessity, and our studies show that all federal power is subsidized. We cannot 'get along' with public power if we want to live as free people. For if we are enticed into a greedy scramble for public bounty, we will ultimately become a nation of panhandlers and moochers" . . . Ted Locke, public utility research specialist, discussed growth of institutional investor. Survey of 110 utility companies showed, he said, "total of non-individual holders of their securities ranging from a high of 71.02% to a low of 5.78%. Average for 80 companies reporting was 41.74%."

ABOUT PEOPLE IN THE INDUSTRY

Unnecessary appropriation of funds for federal power generation was scored last week by Cary H. Brown, member of Engineers Joint Council and of Hoover Task Force on Water Resources and Power. He told Association of Edison Illuminating Companies: "I have full confidence in ability of private utilities to supply the power needs of the country . . . And why, pray, appropriate millions for irrigation of arid lands . . . in face of discussion of plan for withdrawing lands from cultivation to ease farm surplus problem?"

Rochester G&E, excluded by New York State Power Authority from allocations of St. Lawrence River power because it is not in the so-called "marketing area," does not plan to take this lying down. If Power Authority does not change this situation after reconsideration, says Executive Vice President Robert E. Ginna, "We're going to contest it all the way . . . in the courts . . . right to the top. We're going to get our fair share of this power." RG&E particularly objects to preference inherent in some allocations.

More News About People page 36

Attorney General Brownell's Clark Hill ruling is explored and clears up much of controversy over the method of supplying power from the dam to Georgia co-ops as . . .

Chudoff Group Hears Interior's Side

The Eisenhower Administration recently cleared up much of the controversy over the method of supplying Clark Hill Dam power to a group of Georgia rural electric cooperatives.

Top Interior Department officials stood in line in Washington to testify before the House government operations subcommittee headed by Rep Earl Chudoff (D-Pa.). Some of the points brought out at the hearing include the following:

• A July 15 legal opinion from Attorney General Herbert Brownell decided against a tri-contract proposal then being considered for the sale of Clark Hill power. Under the triple-contract arrangement, which made its appearance in government before the Republicans took office in 1953, power from the federal dam would be sold to the Georgia Power Co, under guarantees that it resell most of it under government-set prices to the Georgia co-ops.

• Administration spokesmen had been trying for weeks to testify before the Chudoff group. Throughout hearings in a half-dozen major cities across the nation, the Democratic majority of the subcommittee and the Chudoff-appointed staff had ignored the Administration and its minority representatives on the investigating panel. Until the final series of hearings in Washington, not one Eisenhower appointee had been heard.

• Conferences had been held at the White House on the Clark Hill matter. Georgia Power Pres Harllee Branch said he had been present at one, back in December 1954, when an alternative to the tri-contract arrangement was being explored. Branch pointed out that he attended this meeting because he was informed the Georgia co-ops had first had an audience at the White House on the power sale.

There were other developments as the Chudoff investigation drew to a close. They concerned marketing of power in the Missouri Valley and the Bonneville Power Administration area, and a Rural Electrification Administration loan in Colorado with alleged strings attached. But the Attorney General's ruling, dated July 15, and its effect on the Clark Hill situation stood out as the highlight of the two-month probe.

The ruling had come as Interior Department officials considered reviving the tri-contract proposal—shelved a year earlier—when other approaches to settlement of the long-standing deadlock had failed. Assistant Interior Secretary Fred G. Aandahl testified the Department requested the Justice Department's views when it reconsidered signing the tri-contract agreement with Georgia Power Co.

Brownell's ruling knocked out the tri-contract arrangement. But it did not insure sale of the power to the co-ops (see page 51). It said that, under Section 5 of the Flood Control Act of 1944, the Interior Department must first offer to sell federal power to interested preference customers, before it can contract to sell it to private utilities.

But it also stated that a time limit may be put on the offer to sell to the cooperatives. During this time, the

SPA's Wright Praises Private Utilities

During the Chudoff subcommittee's probe of Interior Department's relations with private utilities and rural electric cooperatives, Southwestern Power Administrator Douglas G. Wright paid tribute to the utilities in his area.

Under questioning from Vance Austin, subcommittee staff member, and Rep Clare Hoffman (R-Mich.), Wright pointed to the summer of 1954 when power supply was endangered by the worst drought in the area's history. Utilities, he said, came to his aid.

"They (the private utilities) served my customers with power, but I didn't give them power (in return)," Wright testified.

Representative Hoffman: "You didn't?"

Wright: "No, they agreed to give it till I had it; they helped me through a drought."

Representative Hoffman: "You mean the private companies did it."

Wright: "Yes, I mean it."

Attorney General ruled, the preference customers must make arrangements to receive the power physically. If they cannot, the power may be sold to non-preference customers, he said.

Co-op's Transmission Ability

In the case of Clark Hill, the Attorney General's ruling that the co-ops be required to show ability to pick up the power represents an important qualification to the offer to sell. The only transmission line in Georgia connecting with Clark Hill Dam is that owned by Georgia Power Co. Georgia Power, favoring the tri-contract arrangement, had ruled out any wheeling arrangement for several years.

The alternative the co-ops had for receiving the power was to build a competing transmission line to the dam. Costs would run about $75 million, according to an REA estimate. Interior could not build such a line, even if it wanted to, because Congress has refused to appropriate the necessary money. And the co-ops themselves have not indicated they want an REA loan for this purpose.

The situation emphasizes the fact that Brownell's ruling may have permanent bearing on the preference laws.

Interior Shifts Emphasis

Before 1953, court decisions and prior opinions of the Attorney General had determined that preference customers must be granted reasonable time to provide facilities to accept delivery. But Democratic Administrations had always placed emphasis on establishment of the preference customers' rights in the matter.

Now, the Executive Branch has shifted emphasis to a determination of the rights of non-preference customers under the preference laws—stressing the point that, when preference customers have been given what is considered by others a reasonable time to provide their facilities, non-preference customers should have a chance to take it.

Interior officials view their stand as a reversal of a 20-year attempt to press the co-ops' rights to the ultimate, without regard to that portion of the law which requires disposal consistent with sound business practices. Aandahl and his staff are making an effort, for the first time since the law was passed in 1944, to define clearly the outer limit of preference to which co-ops are entitled so that a definition of the rights of non-preference customers may be established.

Despite Georgia Power's opposition to a wheeling arrangement, a half-dozen meetings have taken place on this subject since shelving the tri-contract proposal. Southeastern Power Administrator Charles W. Leavy testified that a draft of a wheeling agreement was drawn up in late August, with Georgia Power's ultimate approval. This resulted in a redraft during September.

Wheeling Proposal Made

Terms of the second draft now provide that the company wheel 80,000 kw to the co-ops, retaining 40,000 kw for its own use, and includes a company stipulation that no customer picking up power wheeled from the dam by Georgia Power Co be permitted to construct its own generation and transmission facilities; that wheeling be limited to a radius of 150 mi from the dam; that the company be permitted a compensation for line losses and installation of substation facilities amounting to 10% of the total transmitted; and that the company supply firming power to preferred agencies at the project rate, which would be determined by the Federal Power Commission.

REA Administrator Ancher Nelsen had attempted a new approach earlier this year, testimony showed. Under his plan, Georgia Electric Membership Corp would buy the power at busbar, sell it to the company, and the company would resell it to co-op members of GEMC. Negotiations toward this end stalled, and Interior dusted off the tri-contract proposal, Aandahl said.

Aandahl characterized the draft of the new approach ordered by the Attorney General as a "modified" wheeling contract. He said Interior would be glad to sell the entire output of the dam, if the co-ops came in and offered to buy it. "But the Georgia co-ops didn't show any way of taking it, and didn't give assurance they could use it all," he added.

Aandahl emphasized that Interior was protecting the government's interest in refusing to sell the power to the co-ops until they had shown they could dispose of it. Furthermore, he said, to turn over title to the dam's output at this stage would be to weaken the government's position in negotiating a wheeling agreement with the company.

Co-op's Advantage Pointed Out

Rep Charles R. Jonas (R-N.C.) pointed out that Interior had been directed by Congress, when denied transmission line funds, to negotiate the best possible wheeling arrangement to get the power to the co-ops. He added that, even if the co-ops obtained all the dam's power, they would still need steam facilities to firm it up. Aandahl agreed, and explained that Georgia Power's steam facilities, to be used under a wheeling arrangement to firm up Clark Hill output, provide this advantage for the co-ops over ordinary wheeling relationships.

After unearthing the Attorney General's opinion and exploiting it fully, the subcommittee turned its questioning over to Associate Counsel Vance Austin, on leave from his post as executive manager, Colorado co-ops.

Collusion Charge Denied

Austin centered on charges, made during a recent Denver hearing, that REA had insisted that a cooperative, Colorado-Ute Electric Association, integrate its system with a power company, Western Colorado Power Co, as a condition to obtaining an REA loan (EW, Sept. 19, p 108).

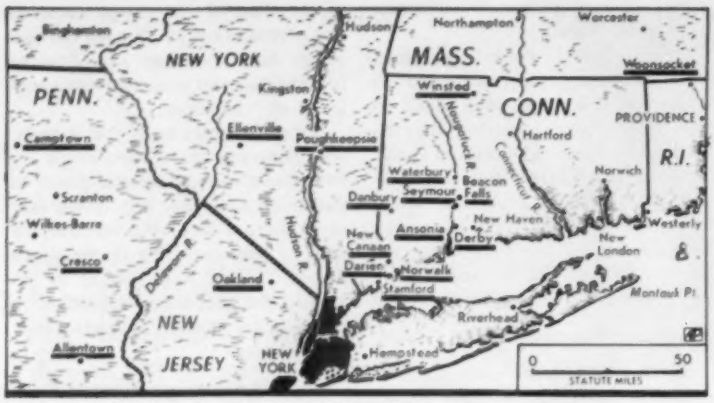
Ancher Nelsen vigorously denied that any such condition had been set forth. He declared: "Under no circumstances nor at any time has REA said that only on those conditions would a loan be made . . . We recommended that they use their best judgment, but we did not tell them 'this you must do, or else.' The arrangements made were entirely the responsibility of the Colorado people without direction or pushing of any particular plan or contract on the part of REA."

Furthermore, he pointed out, the Colorado-Ute board of directors voted 6-1 to enter into an operating agreement with the company.

Brownell and Branch

Attorney General Herbert G. Brownell's July 15 opinion of a proposal to distribute Clark Hill Dam power to Georgia Rural Electric cooperatives is reprinted, in part, on page 51 of this issue.

Remarks made by Harllee Branch, Georgia Power Co president, regarding the Chudoff subcommittee's investigation of the Clark Hill controversy appear on page 63 of this issue.



CITIES UNDERLINED ON MAP ABOVE AFFECTED AS . . .

New Floods Strike Northeast

. . . hitting hardest in Connecticut where three utilities damaged; substation and plant inundated; 230,000 customers out of service

Still struggling to overcome effects of the mid-August floods, areas in six Northeastern states were inundated again last week as rivers surged over their banks after three consecutive days of rain.

Southwest Connecticut was hardest hit, but parts of New York, New Jersey, Pennsylvania, Massachusetts, and Rhode Island were affected.

Although utilities were still busy restoring service and estimating damages, the following reports were obtainable as EW went to press:

Connecticut Power Co lost a 66-kv line between Norwalk and Stamford as a result of a train wreck caused by flood wash-outs. The line was out for 24 hours, and parts of industrial loads were imperiled. Factories and commercial users in Stamford were asked to get along with half their normal power last Monday.

Connecticut Light & Power Co's Norwalk substation was flooded by seven feet of water. As a result, 4,800-v distribution circuits were shortcircuited and fire resulted. Otherwise CL&P escaped damage to plants and power lines. The power company reported it was "completely out of trouble."

Housatonic Public Service Co estimated damages at $15,000. All load was lost when the Derby Plant went out of service with 27 auxiliary motors submerged, and when the interconnection with CL&P was broken with waters at the busbar. Forty percent of the load was restored in 20 hours, and the Derby Plant was expected to be in operation possibly within about five days.

These three companies serving the western half of Fairfield County, Conn., had more than 230,000 consumers out of service.

Private Utilities Rap State Plans for St. Lawrence Power

Private utilities, at New York State Power Authority hearings last week, strongly opposed the sale of St. Lawrence power to tax-free preference groups and construction of state-owned lines to transmit power from the project.

Chairman Robert Moses presided at the New York City hearings on proposed contracts for sale of 100,000 kw to State of Vermont, 30,000 kw to City of Plattsburgh, N. Y., and 10,000 kw to Plattsburgh Air Base.

Robert E. Ginna, executive vice president of Rochester Gas & Electric Corp, charged that the proposed contracts give preference to tax-free groups. He quoted the Power Authority Act as explicitly stating that primary purpose of the power is "for the benefit of the State as a whole and particularly the benefit of domestic and rural consumers to whom the power can economically be made available."

Ginna recommended, therefore, that the proposed contract with the Air Force be disapproved because it "is definitely not in the public interest." Secondary purpose of the Act is sale to industry, he pointed out. "The Air Force Base is not an industry," Ginna declared.

Pointing out that the 4,500 consumers in City of Plattsburgh are among 985,000 domestic and rural consumers in Authority's "principal market area," Ginna argued that all should benefit equally from the St. Lawrence power. Under Authority's proposal, he charged, the City would receive "nearly 15 times its entitlement."

The utility executive also strongly opposed state-owned transmission lines for delivery of the power to Vermont and Plattsburgh.

Lauman Martin, vice president and general counsel for Niagara Mohawk Power Corp, contended that transmission of St. Lawrence power over the lines of existing utility systems would be the "most economical and most reliable method." This would produce $120,000 a year in property-tax revenues for local communities, he said.

Also representing New York State Electric & Gas Corp, Martin said that under the two utilities' overall plan the cost of delivery of the 140,000 kw would be 2.736 mills per kwhr, compared to 2.971 mills under Authority's plan. "The annual direct saving to all consumers would be $250,000," Martin said.

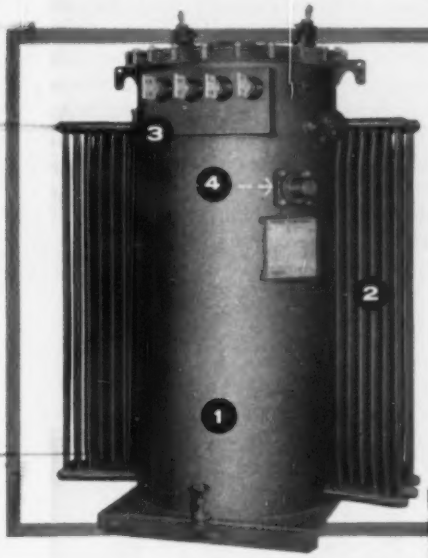
Erratum

A statement by Col Lewis S. LeTellier, consulting engineer, was inadvertently attributed to R. M. Jefferies, general manager of South Carolina Public Service Authority, in EW, Oct. 3, p 83. Speaking at the recent state legislative committee's investigation of Santee-Cooper finances, Col LeTellier, not Jefferies, stated "Some of the Authority's troubles derive from an eagerness to supply worthy people with power at a little less than it costs to produce."

Wagner Form W Distribution Transformers

available in ratings through 500 kva

Enthusiastic acceptance of Wagner Form W Transformers over a period of five years has led Wagner engineers to incorporate the Form W design in ratings of 250 to 500 kva. Wagner Form W Construction in these ratings means a lighter, more compact, easier-to-handle transformer.

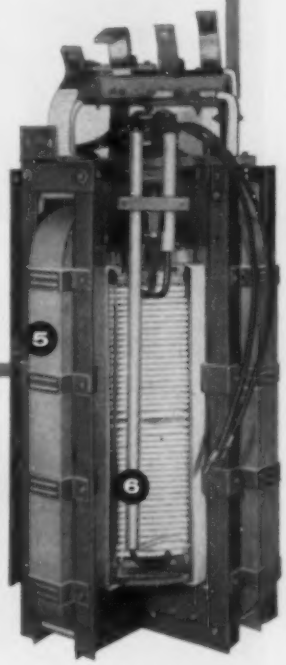


1 HOUSED IN ROUND TANKS . . . inherently strong . . . compact . . . light in weight.

2 ELLIPTICAL TUBE RADIATORS for efficient cooling . . . provide maximum radiating surface in minimum space.

3 LOCKED TANK WALL BUSHINGS . . . each provided with a groove to match a key in the mounting hole of the tank wall . . . bushings are securely locked, cannot turn.

4 WEATHER-PROOF, TAMPER-PROOF TAP CHANGERS . . . operating handle is protected by cover which shows tap position . . . can be padlocked.



5 CORES are of cold-rolled, oriented grain steel, wound through and around the coils. In ratings from 250 to 500 kva, there are 4 core sections spaced 90° apart.

6 WINDINGS . . . high voltage and low voltage coils are wound on insulating cylinders of high mechanical and dielectric strength . . . the winding best suited to each transformer's rating, voltage and current is used.

Choose Wagner Form W Transformers for your next distribution transformer installation—they pay dividends in longer service life.

Wagner maintains a nationwide organization to provide fast, convenient service with branches in 32 principal cities.

Bulletin TU-180 gives complete information on Wagner Distribution Transformers —write today for your copy.

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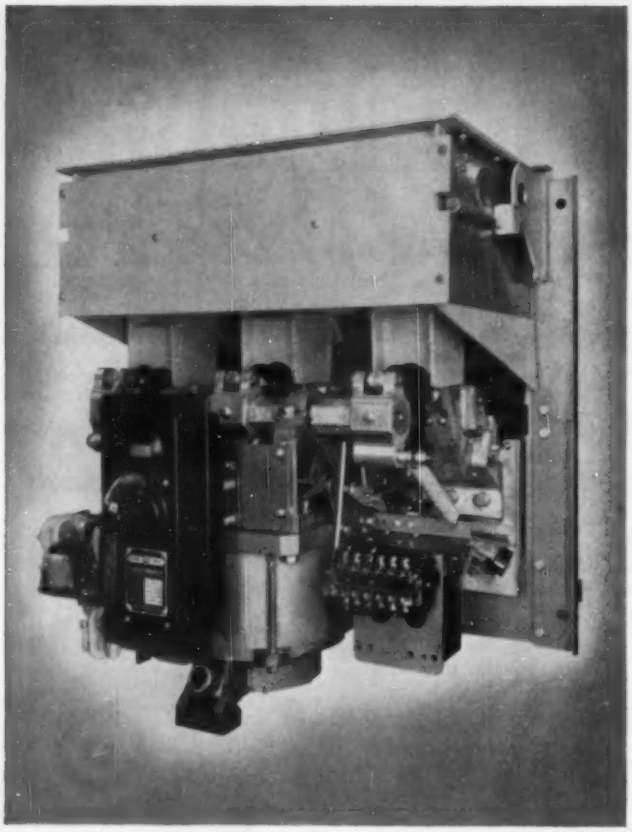
T55-15

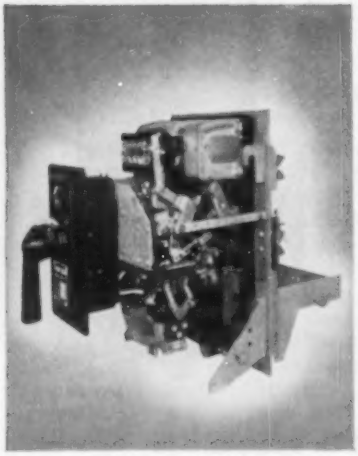
ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES • AUTOMOTIVE BRAKE SYSTEMS—AIR AND HYDRAULIC

News of new developments in

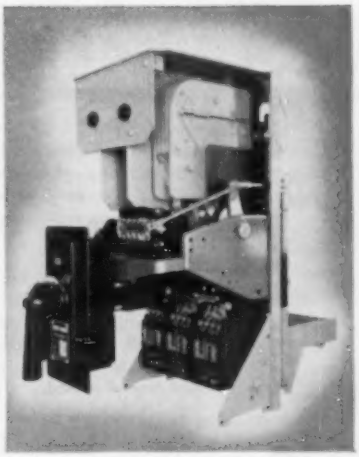


K line of circuit breakers now made through 3000 amp continuous, 75,000 amp interrupting at 600 v a-c

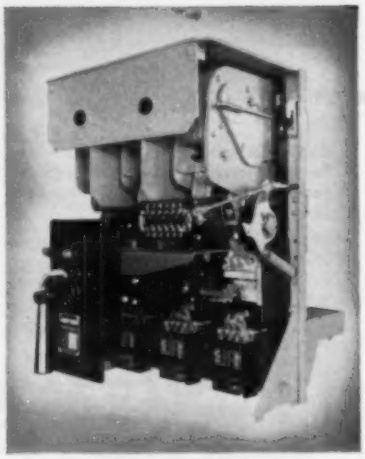
The new Type KD Air Circuit Breaker extends I-T-E's established three-high line of K breakers. It is an extremely compact metal panel breaker which incorporates the proved performance and generous safety factor of the KA, KB and KC breakers. As an integral part of I-T-E switchboard design, it offers the additional advantage of accessibility in minimum space.



KA Circuit Breaker



KB Circuit Breaker

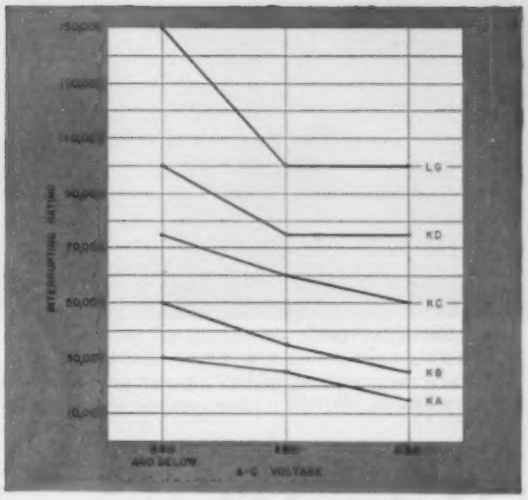


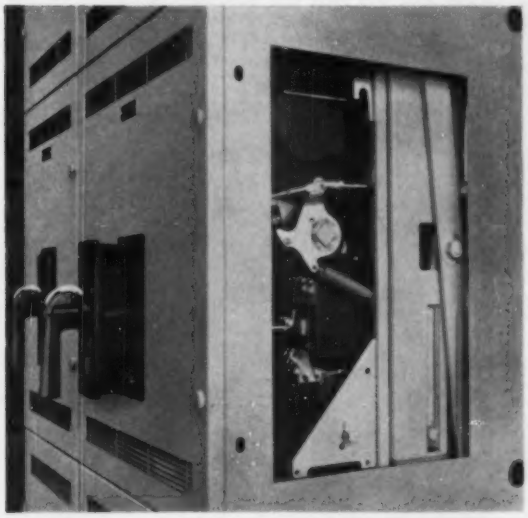
KC Circuit Breaker

I-T-E Low Voltage Switchgear

Circuit breaker interrupting ratings increased in keeping with proposed industry standards

You save, because these standards reduce switchgear costs by permitting the use of lower interrupting rating breakers for short circuit protection in 240 v a-c and 480 v a-c systems. And with smaller breakers you save space, too. Uprating of I-T-E Types KA, KB, KC, KD and LG Air Circuit Breakers is shown in the accompanying chart.





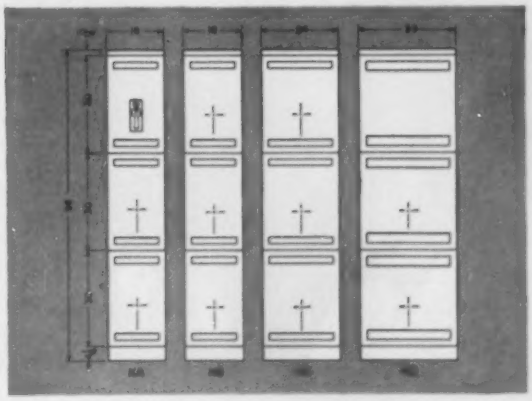
Test position with doors closed now standard on new switchgear

Test position with no increase in over-all switchgear depth! This facility is by far the most convenient, most compact design on the market. It is an exclusive with I-T-E Switchgear, yet it costs no more. Additional advantages are increased safety, reduced maintenance, improved cleanliness, easier circuit identification.

New compact breaker design saves space

All I-T-E Type K Circuit Breakers can now be assembled three-high. KA, KB and KC frame widths remain the same as before. However, the new KD breaker is 6 in. narrower than the old LG frame, and can be arranged in a three-high compartment, space being thus provided for instrumentation in the same frame.

For complete information, contact your nearest I-T-E field office. Or write I-T-E Circuit Breaker Company, 19th and Hamilton Sts., Phila. 30, Pa.



I-T-E CIRCUIT BREAKER COMPANY · Switchgear Division

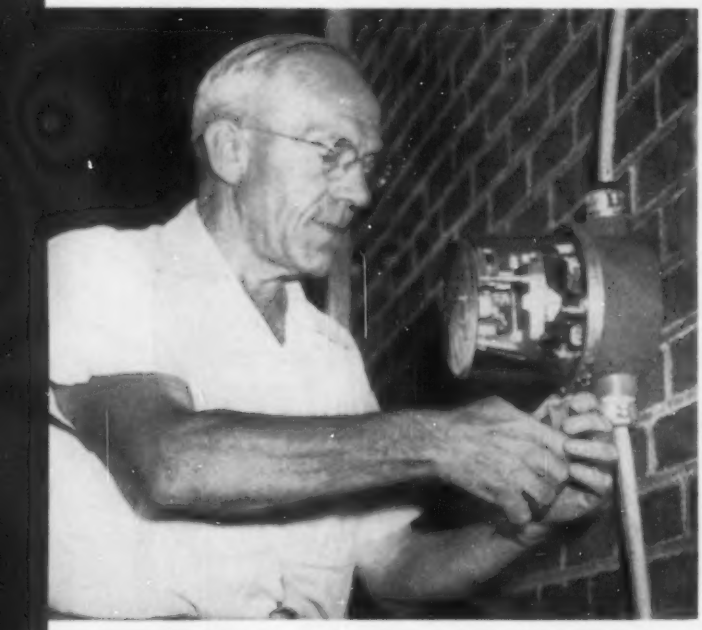
500,000TH CUSTOMER was recently put on the line by Long Island Lighting Co. Pres E. W. Doebler and Mrs. O. H. Hicks, the new customer, look on as a 14-carat gold plated meter is installed at the Hick's home commemorating the event

NEW ELECTRIC RANGE was presented to its 400,000th customer by Houston Lighting & Power Co. Mr and Mrs Bruce Broz and their two daughters, of Pasadena, Tex., are shown with W. A. Parish (left), utility president

Meter Milestones

. . . symbolizing the industry's growth have been reached by four utilities; Long Island Lighting added its 500,000th customer; Houston Lighting & Power, 400,000th; Atlantic City Electric, 200,000th; Georgia Power & Light, 50,000th

GOLD PLATED METER was also installed in Valdasota, Ga., for th G. H. Cross family who recently became the 50,000th customer to be served by Georgia Power & Light Co. Above are (l to r) B. H. Roberts, builder of the Cross home; Mr and Mrs Cross; GP&LC Meterman John Hegan; Lex Curtis, Westinghouse Electric Corp which designed the meter; and J. W. Lastinger, GP&LC president



VETERAN METER TESTER Henry J. Michel sealed the meter for Atlantic City Electric Co's 200,000th customer, Mr and Mrs R. T. Scola of Kresson, N. J. Michel started in 1920 as a meter reader with Atlantic County Electric Co which was acquired later by Atlantic City Electric. The Scola home has an all-electric kitchen with latest appliances

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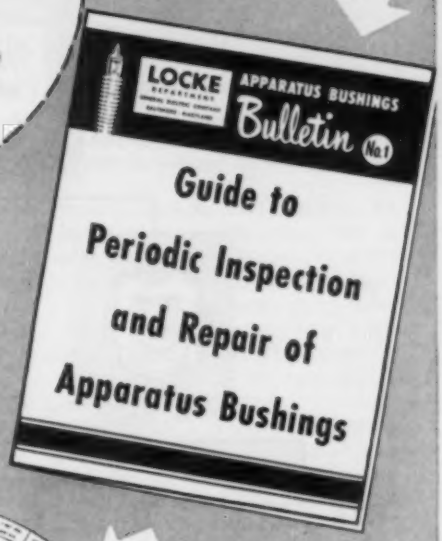

If your job involves switch & bus insulators . . .
the Cantilever Strength Estimators make it easy for you to determine cantilever load applicable to upright or underhung cap and pin type Switch & Bus Insulators, at various distances beyond the free end of their mounting.

The Switch & Bus Insulator Selector is a specially designed, easy-to-use circular slide chart. With it, you can quickly determine the mechanical and electrical characteristics of an insulator stack for any given operating voltage or BIL.

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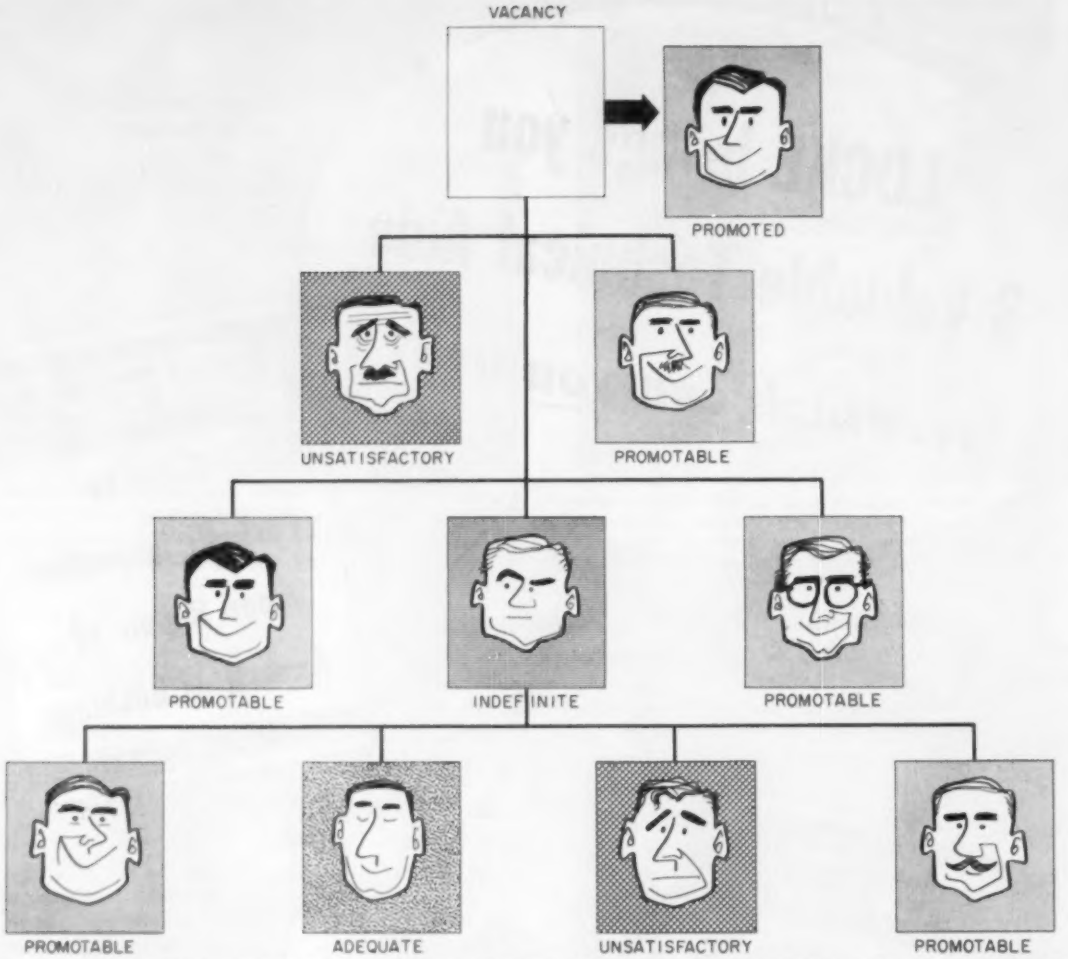


FIG 1—NORMAL EXPECTATION IS TOP JOB WILL BE FILLED BY PEOPLE IN LOWER ECHELONS WHO ARE PROMOTABLE

Management Needs Successors

MANAGEMENT
Industrial Relations

Concerns should build personnel policies as an instrument for recruiting and preparing their employees to fill higher vacancies

R. M. WINSBOROUGH,
Management Consultant, Middle West Service Co, Chicago, Ill.

Management is the science of getting results through the direction of people. People are management's greatest assets, and usually its greatest headache. Most problems of executives concern people.

But management in itself is composed of people. Only by the careful selection of management personnel can a company build a successful and efficient organization.

To develop the best organization, the mechanics of organization and the actual operation, or dynamics of organization, must be separated. Management functions of forecasting, planning, and organizing are primarily activities carried on without reference to or thought of the individuals in the organization who are going to carry out the plans. When it comes to running the organization, it is necessary to think of the individuals in order to carry out the operating functions of commanding, coordinating, and controlling. In actual practice people must also be considered even in forecasting, planning, and organizing.

The important thing is to keep things in the right order. If people are considered first and organizational structure planned around individuals who happen to be available at a given moment, many problems arise. The organization should be planned so that people can be trained who will be ready when wanted to succeed to each position in the organization. If people are trained for an illogical group of duties built up around a particular individual, there will be trouble. The new man on the job cannot reproduce

the exact experience of the man he is replacing.

What then is the solution when there is a problem of organization that needs to be straightened out? The best thing to do is to imagine that you are starting with a clean slate, draw an organization chart of the ideal organization and get the responsibilities and functions properly located. Then lock the chart in the safe and keep it as a goal towards which to work every time a change becomes necessary or appropriate.

What Executive Should Do

The executive must make two firm resolutions:

1. Whenever a position falls vacant or any organizational change becomes possible and desirable, he will pull out the ideal organization chart and have a look at it.

2. So far as is humanly possible, he will never change the organization in the wrong direction, that is, farther away from the ideal. All changes should be toward it.

This may seem like a slow process. Actually, once the plan is made, if the executive is consistent and determined, an organization can be reshaped rather quickly in the direction of greater efficiency and greater satisfaction for everyone in it.

Five Steps Required

To be specific, the steps in the management inventory sequence are five:

1. Analysis of the organization to determine best structure for the company.

2. Preparation of job descriptions clearly setting up duties and responsibilities.

3. Preparation of organization charts clearly defining lines of authority.

4. Evaluation of present personnel.

5. Evaluation of potential replacements.

Next is the preparation for management of an inventory of the promotable executive talent. It is then possible to see whether there are probable replacements and from whence they are coming. This information is useful in pointing the direction in which the management must look for new young people who can grow into the jobs available at known retirement dates.

Then after a desirable organization chart has been drawn up, the steps must be set down in order, which management can take as the opportunity presents itself to change the organization in the direction of the approved ideal.

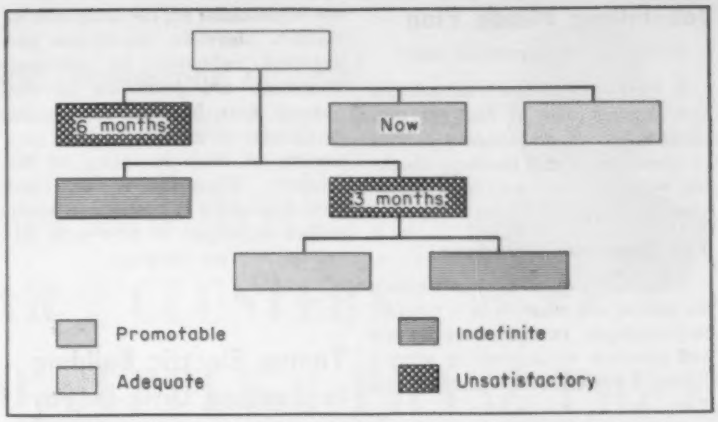


FIG 2—ORGANIZATIONAL SCHEDULE shows different degrees of readiness for promotion and the time scale for such moves as planned by management

Figs 1, 2, and 3 indicate what can be done to show the executive at a glance how well the organization is staffed with future replacements. These charts represent the composite practices of 53 of the largest American concerns.

These personnel evaluations should not be based on the judgment of any one person. They should be the composite judgment of the best sources of evaluation available to the executive. Evaluations may change, particularly in the case of aggressive, hardworking young people willing to qualify themselves for higher jobs.

Such an inventory shows the executive his present staffing situation and its probable development in the next five or ten years. He will not be bound by these findings. He is free to change them to conform more closely to his idealized organization chart. But as most management personnel enter the industry in non-management capacities, those in the latter group today will be the management staff in a few years. Besides, those who do not advance also play an important part in the success of a company.

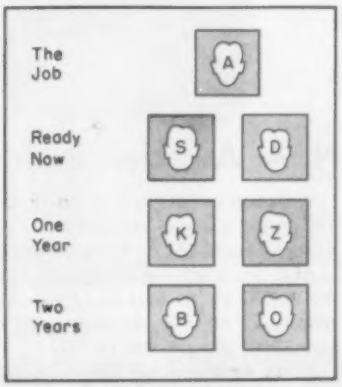


FIG 3—JOB POOL CONCEPT shows usual line of job-to-job progression in firm

That there is a growing realization of this is shown by the increasing effort made to place people in jobs for which they are qualified. This is an indication also of the growing willingness of management to deal objectively with personnel problems.

Testing Controversial

The subject of testing employees is a large and controversial one. In many places testing has been carried unnecessarily far, in others not far enough.

It would be a mistake to think that the administration of a battery of tests alone is all that is required to decide which applicant should be employed or which employee promoted.

That does not mean that tests are useless. It only means that tests alone cannot foretell the conduct of an employee. But tests can tell whether the applicant has the intelligence required for a particular job for which he is considered.

This big subject perhaps can best be summarized as follows:

1. Have a job description which tells what work a particular job requires.

2. Use certain tests to tell whether or not the individual considered has the skill and intelligence to perform the job.

(Continued on next page)

Job Filling Needs Plan

(Continued from previous page)

3. Very often the test is the quickest and cheapest way to find this out. Other ways are probationary periods of employment and thorough checking with the employee's past supervisors.

Two Questions Important

What tests will not tell is whether the person will prove to be a satisfactory employee. In short, there are two real questions which come up when a person is considered for employment. They are:

1. Can he do the job? This is a question of capacity and ability and nothing else. These are often referred to as the "can do" factors.

2. Will he do the job? By this is meant, is this man motivated to make a satisfactory employee. This is not a question of whether he has the ability to perform the job. It is a wholly different question. It is a question of whether he has the personality, motivations, disposition, and desire to perform in the job the "will do" factor.

Most people who are discharged are not dismissed for lack of ability. They prove to be unsatisfactory for the "will do" not the "can do" reasons.

The best way to predict what a person will do is to find out exactly what he has done. Behavior is almost entirely a matter of habit. The behavior a person has manifested in previous situations is, in all likelihood, the behavior he will manifest in future situations of a similar sort. The most reliable index to what an employee will do for you is what he has done either for you or someone else.

Problem Boiled Down

So, the problem of selection and placement boils down to:

1. Knowing what the job requires. Very often we don't know that as clearly as we should.

2. Ascertaining what the employee can do.

3. Trying to determine what the employee will do in the job for which he is considered.

It is a mistake to take any single personnel program lock, stock, and barrel and try to apply it in any company. The personnel program must fit the characteristics of the company.

Each company is a social organization, having its own habits and social pattern. Certain things acceptable in one organization are not acceptable in another. Therefore, use of new and improved techniques for selection, placement, and promotion of employees must be adjusted to the background of the company and personality of those in charge of the company. When that is taken into consideration, it is possible to apply certain techniques to very great advantage in every company.

Tampa Electric Building to Feature Drive-In Pay

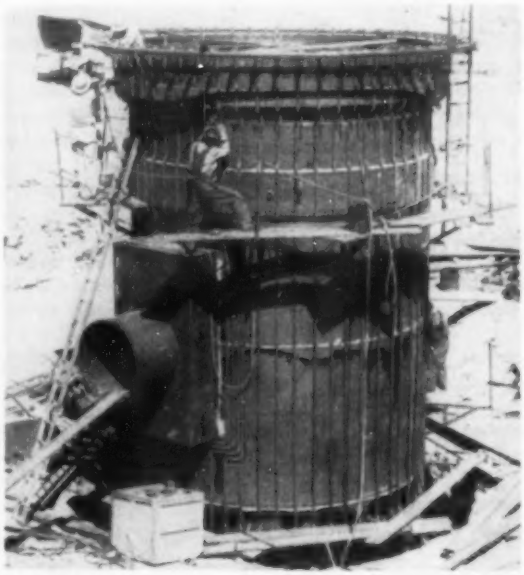
A drive-in pay window is featured in a $250,000 office building now under construction for Tampa Electric Co in Florida.

Heat-pump temperature control, escalators, and a 400-car parking lot for customers and employees are other highlights of the two-story structure, slated for completion next July 30.

Study for BPA Begun on Bundled Conductors

Research studies of bundled conductors for power transmission lines have been started by the Division of Industrial Research, State College of Washington, for the Bonneville Power Administration. Directed by A. R. Hard, the study will include tests in vibration laboratories and on a specially constructed installation near the college campus at Pullman, Wash.

The first phase of the study program will investigate characteristics of bundled conductors in the vibration lab. There a 150-ft span will be vibrated by a motor. Subsequently BPA will build an outdoor test span 900-ft long near the campus for intermediate testing between lab and field conditions. A span of Chukar cable will also be strung outdoors for comparative purposes. Spacing and design of spacer bars are slated for study in the program as well.



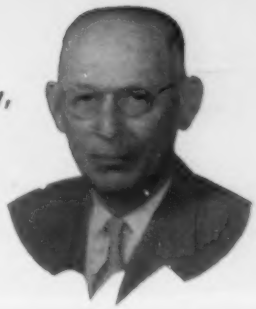
N. A. Aviation Builds Reactor for AEC

Workmen install this core cavity liner for a sodium graphite nuclear reactor. The project is under construction by North American Aviation, Inc, for Atomic Energy Commission at the Santa Susana Mountain site near Los Angeles.

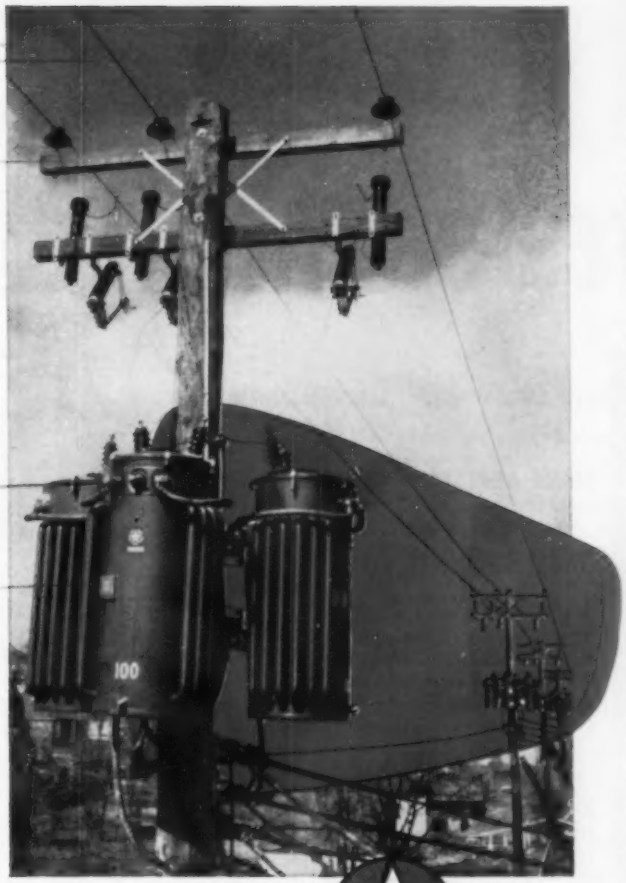
AEC recently invited proposals from organizations interested in purchasing the 20,000 kw of heat to be produced by the reactor. A utility, industrial concern, or other organization could set up an electric power plant on the site and derive about 7,500 kw.

North American Aviation is building the reactor in connection with AEC's program to develop economical electric power from atomic energy. The reactor is located 30 mi northwest of Los Angeles.

J. A. Siegfried, DISTRIBUTION ENGINEER
Pennsylvania Power & Light Company,



Tells HOW... and WHY... POLE STAR "CLUSTERS" ARE USED TO SUPPLY 3 PHASE POWER TO SHOPPING CENTER



Because of the compact Pole Star design, even 100 kva units can be cluster-mounted, as shown in this view of the installation described in Mr. Siegfried's letter. The Pole Star cluster is supplying three phase power to a shopping center.

In a letter to Ray Swoish, vice president of Pennsylvania Transformer Company, Mr. Siegfried says, in part:

"You will probably remember that we talked about mounting large size distribution transformers on a cluster mounting arrangement last year. Since then, we have installed quite a number of these jobs and have found that they do a quick and neat job.

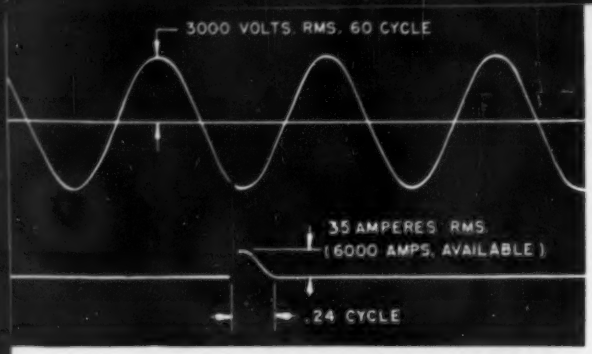
"I am enclosing a photograph of a rather unusual installation which we erected in order to supply electric service to a shopping center in the town of Lemoyne across the river from Harrisburg, Pa. In order to avoid the installation of extremely heavy secondary wires, we made an installation of seven 3 phase banks on adjacent poles. The picture shows five banks; however, there are actually seven banks in a continuous line skipping only one pole. Each of these banks supplies two or three customers. These customers are stores and various other commercial enterprises which go to make up the shopping center.

"You will no doubt be pleased to see three 100 kva Pennsylvania Transformers mounted on a single pole shown in the foreground of this picture. There are five other Pennsylvania installations and one bank of (a competitive make)."

Pole Star Distribution Transformers—featuring the patented lap-on-top core — are available in all single phase sizes from 3 through 500 kva, 480 through 67,000 volts. The Pole Star line includes a 167 kva "Featherweight" with standard EEI-NEMA mounting provisions, and Protected Pole Stars (Type CSP) up through 100 kva.

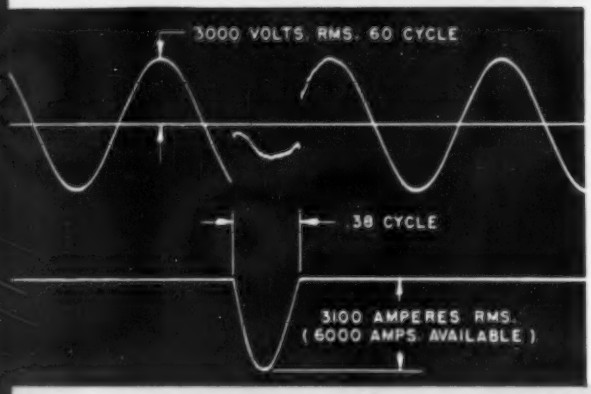
POLE STAR

Pennsylvania Transformer Company
A McGraw Electric Company Division
CANONSBURG, PENNSYLVANIA • *Greater Pittsburgh District*

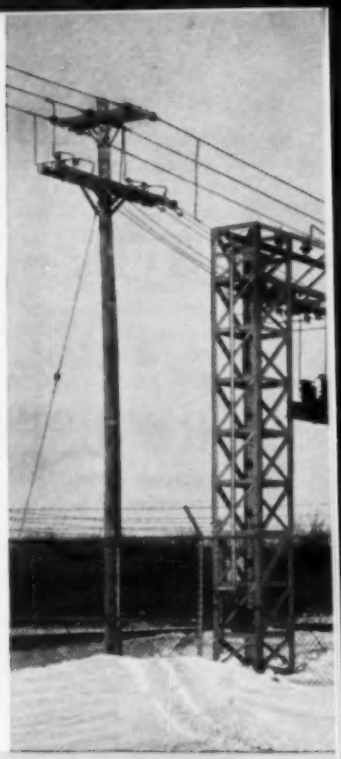


VALVE ARRESTERS HANDLE HIGH FAULT CURRENTS BETTER

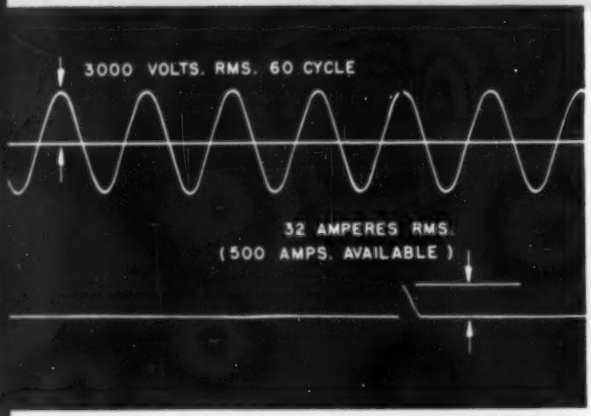
VALVE Type Arrester, on a 3000 volt, 60-cycle system, with 6000 amperes available, draws 60-cycle power follow current of only 35 amperes RMS.



EXPULSION Arrester, on the same system, draws 3100 amperes follow current—over one-half the available short-circuit current.

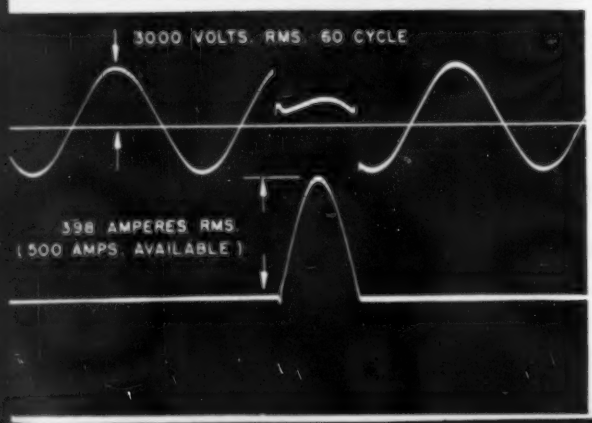


Valve Arresters Are Not

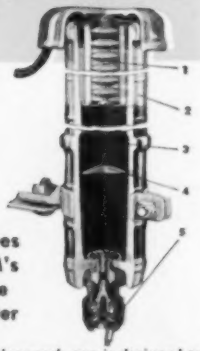


VALVE ARRESTERS HANDLE LOW FAULT CURRENTS BETTER

VALVE Type Arrester, on a 3000 volt, 60-cycle system with 500 amperes available, draws only 32 amperes, as shown in this oscillogram. And it interrupts the follow current in a half-cycle, or less.



EXPULSION Arrester, on the same system, draws 398 amperes. An eroded expulsion arrester may not develop enough pressure to clear the arc—and a sectionalizing device would operate unnecessarily.



Features of L-M's Valve Arrester

1. The ladder spark gap is designed to provide an optimum balance between 60-cycle sparkover and impulse sparkover.

2. The Pyrex glass housing permits visual inspection to detect mechanical or electrical damage.

3. "Granulon," the valve material, is able to withstand severe heating which accompanies heavy strokes of lightning.

4. Lens-shaped electrodes in the element compensate for "skin effect," assuring uniform distribution of surge current throughout the valve element.

5. L-M's exclusive "Isolator" gives positive assurance against grounding feeders by instantly disconnecting the ground lead from the arrester if the arrester should ever become damaged.

LM® **LINE**

AT THE SUBSTATION: The application of the valve arrester is not limited by the available short-circuit current. The expulsion arrester, operating on a pressure principle, is definitely limited in this respect.

OUT ON THE LINE: The valve arrester operates equally well with very high or very low available follow current. The expulsion arrester may fail to interrupt follow current if there is not sufficient current to develop adequate pressure to extinguish the arc.

Affected By System Capacity

...Another Reason Why Valve Types Are Better Than Expulsion Arresters

by **RALPH H. EARLE**
Chief Engineer
General Products
Line Material Company

L-M engineers have made thousands of tests and observations of the performance of both valve and expulsion type arresters. They have worked closely with operating companies on comparative tests. The inescapable conclusion is that the valve principle results in superior arrester performance.

One of the major advantages of valve type arresters is that they are no respecters of system capacity. They work equally well at the bus of the largest generator made, or at the most remote point of a rural line.

This is not true of expulsion arresters. They pass far more power follow current, and erosion on the expulsion arrester is rapid, life is comparatively short.

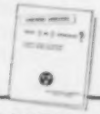
Valve type arresters work equally well on small surges, and on systems with very low fault currents. In such situations an expulsion arrester may take several cycles to interrupt follow current. A badly eroded expulsion arrester may not work at all, thus blowing the sectionalizing fuse, or causing unnecessary recloser operation.

When 60-cycle system capacity is considered, valve arresters are preferred because:

- **A** the valve arrester has unlimited 60-cycle capacity. It operates equally well with very high or very low available follow current.
- **B** valve arrester life is completely independent of 60-cycle system capacity.
- **C** the expulsion arrester, which operates on the pressure principle, may explode because of pressures developed if its fault current rating is exceeded.
- **D** the expulsion arrester may fail to interrupt follow current if there is not sufficient current to develop adequate pressure for arc interruption.

Why This Policy

When a manufacturer of two types of arresters adopts a policy of recommending *one* of the two types, there must be a good reason. The facts behind this policy are given in a new bulletin, "Valve Versus Expulsion Type Arresters." Ask your L-M Field Engineer for a copy, or write Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Co. Div.).



FOUR PRINCIPAL REASONS
For Recommending Valve Over Expulsion Arresters

1. **Better Protective Characteristics**—The valve arrester sparks over more quickly and at lower voltages on lightning surges.
2. **Unlimited 60-Cycle Capacity**—The application of the valve arrester is not limited by the available short-circuit current.
3. **No Fuse Coordination Problems**—The valve arrester will pass relatively small values of 60-cycle follow current, regardless of system capacity.
4. **Longer Life**—The valve arrester is electrically and mechanically unaffected in handling lightning discharges usually encountered in service. Its life is relatively unlimited.

MATERIAL Lightning Arresters

D. K. BLAKE, T. C. DUNCAN, W. R. BULLARD, AND R. F. LAWRENCE CONFER

EEI T&D Airs Voltage Boost Plan

- **Task Force recommends use of 265/460Y for business areas**
- **Alternate is 255/440Y when residential use is involved**
- **Automation demands closer dip-free voltage regulation**

Recommendations of the Task Force on Higher Secondary Voltages highlighted the Sept. 29-30 EEI Transmission and Distribution Committee meeting at New Orleans. The preferred nominal voltage should be 265/460Y with 255/440Y a permissible alternate, reported its chairman, T. C. Duncan.

Selection of these values, he noted, recognizes that 277/480Y is a maximum rated system voltage with the minimum at 252/436. The corresponding 265/460-v nominal would be preferable to other voltages considered by the Task Force for industrial service to produce maximum torque on 440-v motors and economy in distribution and building wiring. But because the new voltage may be used to advantage for apartment buildings in commercial areas and for highly electrified housing developments, 255/440Y is recommended as a permissible alternate. This voltage permits direct supply to 240-v appliances.

Voltage Is Debated

Air conditioning loads in large buildings have virtually forced substitution of 277/480 for 120/208 v, observed D. K. Blake, General Electric Co. But despite rapid growth of residential loads, savings to the customer from a corresponding change to 240/480-v service would not be enough to win general acceptance. He urged prompt and thorough study of residential service voltage by EEI and NEMA jointly, predicting that the coming decade will be the greatest in utility system growth.

R. F. Lawrence, Westinghouse, concurred in the proposal of EEI-NEMA review of residential service voltage. He observed that Blake's marginal savings for 240/480 v become 30% or $130 per house for the 265/460Y-v system (EW June 13, p 82). This service voltage proves economical for integrated demands from 1.6 to 10 kw or more per customer.

Additional support for the higher voltage was voiced by W. R. Bullard, Ebasco. He predicted that continued improvement would make higher-voltage lamps and appliances more suitable and questioned the accuracy of Blake's comparison showing negligible savings at 240/480 v.

Rebuttal by Blake challenged the validity of Lawrence's claim of 30% savings for the 265/460-v system. He suggested that comparison with a 120/240-v residential system of comparable reliability and simplicity would show little difference. But he heartily endorsed its proposal to retain 120-v for lights and small appliances.

Automation Accents Voltage

The power industry must tell its customers that voltage dips cannot be completely eliminated, advised E. E. Quick, Detroit Edison Co. It must also cooperate with control equipment manufacturers to coordinate their designs with practical power system characteristics.

Industrial customers in Detroit have asked for voltage regulation within ¾ v with deviations limited to one cycle, Quick continued. Investigation of their service complaints disclosed that customers are moving from reliable cable-fed areas to the suburbs, modernizing equipment in the move. Complaints include tool breakage, clutch releases, machine stoppages, gas-fired furnace shut downs, and mercury light blackouts. Cause is usually only a momentary dip while a faulted line in the system is cleared.

Buyers, Engineers Cooperate

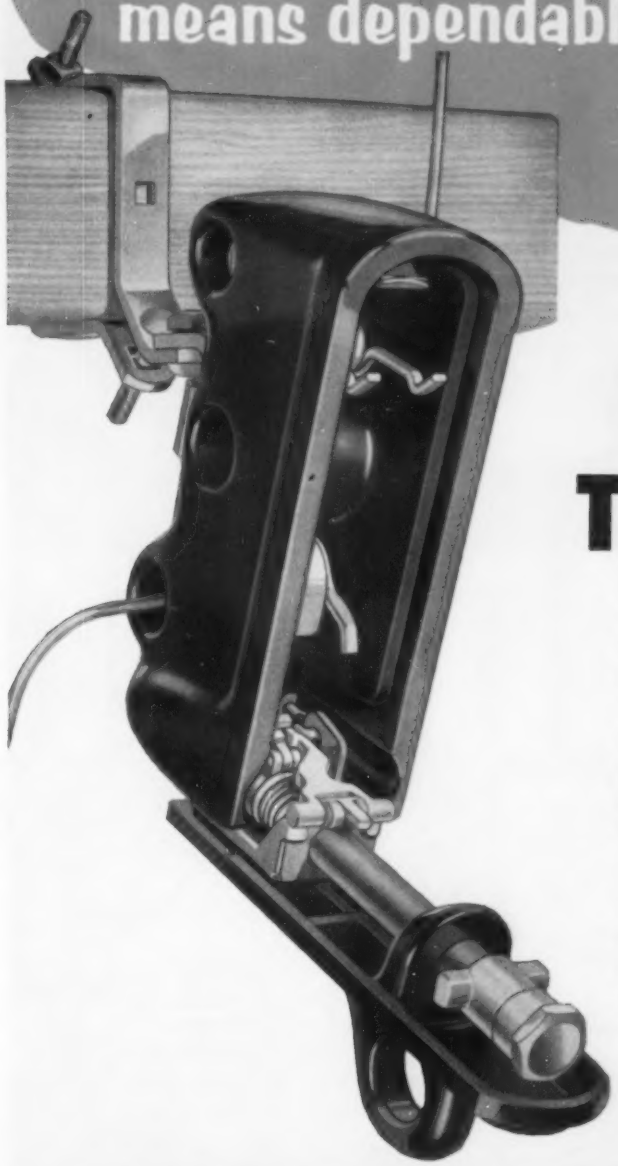
Buyers, storekeepers, and engineers have the same over-all objectives, said W. H. Jones, Philadelphia Electric. They are "to render the best possible service for the lowest possible cost to our customers." Problems are resolved by recognition of each others problems and whole-hearted cooperation to overcome them, Jones concluded.

The first 23 replies to a survey by the Mutual Assistance Task Force reveals that the majority already belong to regional plans. All but one are willing to participate in a tentative national roster. More than half would include generating and underground plant personnel.

Victims of Connie, Diane, and Ione considered communication the greatest problem. W. R. Doar reported that Carolina P&L's carrier stayed in but commercial telephones and one microwave station failed. Jamming of their single radio channel suggests

(*Continued on page* 125)

This weather protected housing means dependable service



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Notice how the lead-in holes for the back-connected terminals *do not enter* the cartridge chamber. This eliminates the source of most troublesome dirt and moisture. And see how the contacts and hanger bracket are *bolted through* the massive porcelain wall. They can never pull out like cemented attachments.

KEARNEY's exclusive *spring* contacts cushion the impact of tube recoil, protecting and prolonging the life of the cutout. The contacts stay in adjustment for high contact pressure . . . even after long service.

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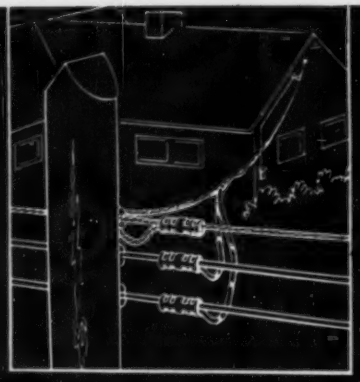

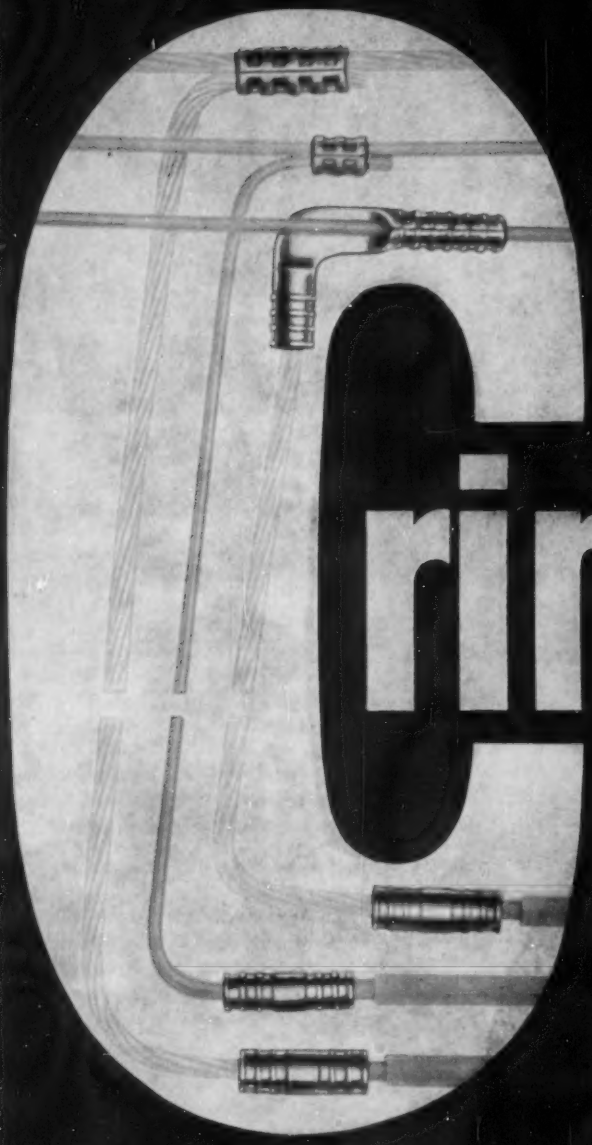

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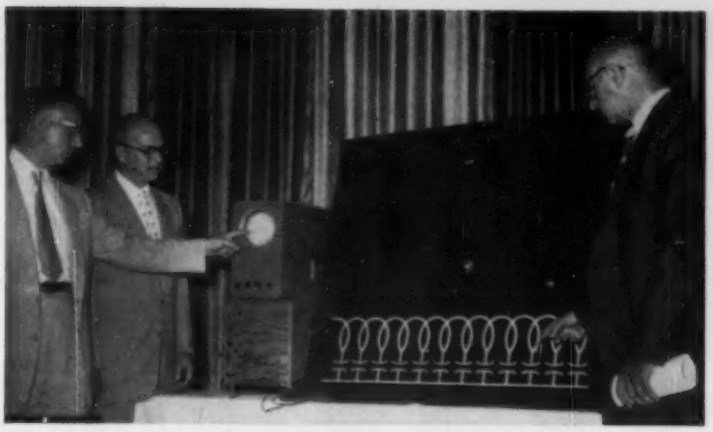
(*Contniued from page* 22)

substituting a mobile unit for each fixed station to cut area coverage and permit simultaneous use in several local areas. R. L. Ware, Virginia Electric & Power Co, credited amateur radio messages overhead by a company operator for much prompt and valuable information about storm damage.

Connecticut L&P found traffic congestion a serious problem, added R. C. Hicock. He reported that training provided by their disaster plan paid off even though it had not contemplated floods but urged that future plans include coordination with traffic control authorities.



RADAR INDICATION OF FAULT LOCATION is pointed out by J. P. Lozes, Jr, NOPSI, to H. E. Cody, CEICO, as T&D Chairman Fiedler applies fault to cable facsimile

Heat Threatens Networks

Prolonged hot weather last summer was blamed by T. C. Duncan for a series of four and five feeder outages in Consolidated Edison's Brooklyn secondary network. One of these caused such overloads that radio, television, and sales personnel all solicited load curtailment over one 8-hour load period. Causes, he said, were these:

1. No rain fell during the hot spell.

2. Load did not exceed expected peaks but remained on longer, depriving cables of cooling periods.

3. Ducts were hot in congested areas, permitting a "runaway" temperature in some cables.

Crash program, continued Duncan, included manhole blowers, water spray in idle ducts, excavating and backfilling duct lines with wet tile. The objective was dropping ducts to 50 C. But the permanent program provides more duct lines limited to 8-cable occupancies.

Consideration of the probability of feeder outage during peak load periods in conjunction with load test and equipment capability data permits scaling down reserve capacity in secondary networks, observed P. B. Boyd, Georgia Power Co. Fans and water sprays offer quick relief when this practice poses a threat to transformers during a prolonged overload.

Load tests made yearly with indicating ammeters on a hot summer day have proved comparable with those obtained from 2-day charts, Boyd added. Loading is checked with one feeder out, as well as with all feeders in service. These readings are considered as heavy-load averages, not maximum, so any bank showing 108 to 115% with one feeder out is scheduled for relief before the next summer peak.

The "radar" method of fault locating can be applied to cable provided the pulse is timed properly with the crest of voltage from a 60-cps test set, reported J. P. Lozes, Jr, New Orleans Public Service. Coordination with the hi-pot voltage helps to overcome difficulties experienced with earlier equipment on cable faults which are rarely completely open or solidly shorted. But good measurements are still difficult for faults in water.

Cable Corrosion Solved

Effective cathodic protection of underground cable requires field tests and such remedial measures as isolation from structures, forced drainage, galvanic anodes, and planned loading, said J. B. Prime, Jr, Florida P&L. Tests in Miami revealed galvanic corrosion as the major problem which was solved by force draining the system with rectifiers into graphite-anode ground beds. Further improvement has been achieved by adding a centralized network of drain cables.

New construction isolates cable sheaths from the system neutral and grounds them to zinc anodes beneath each vault, Prime continued. Equipment cases and other ground connections are bonded to the system neutral. Neoprene jacketing of cable sheaths, made continuous at splices by Neoprene paint and tape, reduce exposed area of lead to give an estimated 10-yr life for the zinc anodes after which forced drainage will be applied.

Evaluation of a 3-mile section of 115-kv, H-frame, 336-MCM ACSR line bundled about a year ago by Louisiana P&L (EW, Oct. 4, 1954, p 68) helped to formulate policies for future use, reported W. L. Rush in a paper prepared jointly with H. L. Deloney. Projects will use mid-span spacers where spans exceed 550 ft. Existing 2/0 and 4/0 conductors will be relocated elsewhere whenever possible and replaced with bundled 336.4 MCM or single 666 MCM ACSR. And all future lines not initially built with 666 MCM ACSR or larger conductors will be designed for future bundling.

Bolometer Condemns Joints

During the past year 694 splices on Public Service Electric & Gas transmission lines have been checked for overheating by use of a bolometer, reported R. M. Havourd. These tests have revealed 79 splices with temperature rises of 5C or more, 24 testing 25 to 140C. Rises of 5 or 10C are normal when the conductor shows equal or greater rise from load current. But splices showing rises of 25C or more can be expected to deteriorate further and are replaced as promptly as possible.

Inspection of joints removed, continued Havourd, revealed several which had been installed without compound or with insufficient compression. Many showed severe corrosion, and one indicated by annealing of the steel core and melting of aluminum that it had reached 1,200F. All defective splices had been made on corroded wire for repairs or line changes and proved lack of care by linemen. Original splices made on clean new wire 25 to 30 years ago are still operating perfectly.

heavier loads of expanded trolley system handled by WATERTITE-HAZAPRENE feeders

With 60 miles of scheduled routes for its trackless trolleys today, Wilkes-Barre Transit Corporation's need for dependable electrical power has increased substantially. To keep this power available, they have installed main feeder cables of Watertite-Hazaprene, replacing Hazard feeder cables that had become too small after 27 years of the transit company's growth.

Like the old lead-covered cables, the new Watertite-Hazaprene cables are installed in ducts under a bridge spanning the Susquehanna River. These cables are exposed to constant dampness and weather extremes. The original Hazard cable lived through two floods which submerged the bridge roadway.

With a 27-year service record on the previous Hazard feeder cable, Hazard was the logical choice for its replacement. Combining the electrical and moisture-resisting properties of Watertite insulation with the remarkable weather-resistance of Hazaprene, Watertite-Hazaprene cable provides the dependability needed for this vital feeder circuit in an expanded system.

This is just one more example of the way Hazard cables prove themselves in on-the-job use...in new or replacement circuits that will provide adequate wiring for today's major industries.

For full details on how Hazard cables can help you—not only today, but in the years ahead—write to Hazard Insulated Wire Works, Division of The Okonite Company, Passaic, N. J.

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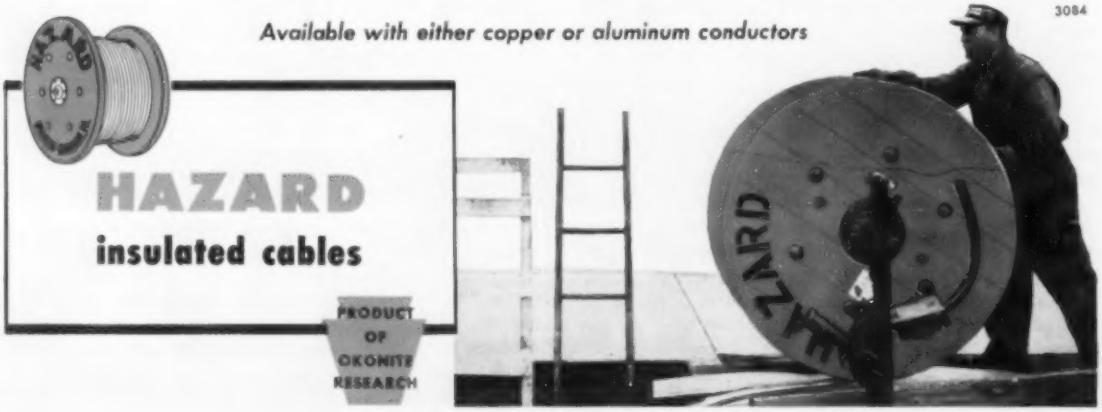
Available with either copper or aluminum conductors



MEETING REPORT

Meter and Service Committees of EEI and AEIC Are Told by Niagara-Mohawk VP G. F. Watters Why . . .

CO-CHAIRMEN R. B. SWALLOW AND G. J. YANDA QUERY SPEAKER WATTERS

Utilities Seek to Complete Niagara

Prediction that bills to permit development of the Niagara River by private utilities will be introduced in Congress again in January was made recently by G. F. Watters, executive vice president of Niagara Mohawk. Private utilities merely seek to complete the development of the river which they started 60 years ago with "the world's first major hydroelectric plant," he said.

"A government project at Niagara Falls would be a single-purpose project, placing government for the first time directly in the power business," Watters added. Economic rehabilitation with generation as a by-product is not a consideration. Already more power is used by industry in the area than in heavily industrialized cities. And every operating farm in the state has power available.

Savings promised by public power advocates are attributable to avoidance of all taxes, Watters asserted. The project would boost public debt $420 million. Exemptions would eliminate $23 million in local, state, and federal taxes, and holders of the securities would enjoy income tax exemptions. Watters spoke before the EEI Meter and Service Committee and AEIC Committee on Metering and Service Methods in joint session at Syracuse, N. Y., Oct. 3.

Approve 100-A Campaign

Enthusiastic approval greeted announcement by John J. Doyle, Murray Manufacturing Corp., of a new program to enlist electrical contractors in the "100-ampere campaign." The scope now includes homes only five to ten years old and many still in the planning stage. Objective is to make contractors think of "selling up" and installing for future needs.

Equipment displayed by other manufacturers promoted greater ease of installation on 100-amp and larger services. One socket featured enlarged wiring space and terminals suitable for 1/0 conductors. But three utilities which provide service entrances for residences consider No. 2 RHRW aluminum adequate for 100-amp loading.

Weigh 200-A Metering

Growing interest was apparent in direct-metered services, both single-phase and 3-phase, for loads to 200 amp. Another extended range meter suitable for such use was announced. And proposals for new heavy-duty mounting devices with terminals and space for the required large conductors drew close attention.

Aluminum shields 0.04-in. thick and costing about 50¢ have adequately protected 174,000 older type meters against damage by lightning, reported E. L. Keller, Duquesne Light Co. Tests have shown calibration changes limited to 0.1 to 0.2% for surges of 10,000 amp. At 50,000 amp speedup averages 2% where similar unshielded meters would show up to 300%. Today's meters do not require this protection against surges, advised Keller, but shields are still desirable to limit sun heating of demand meters.

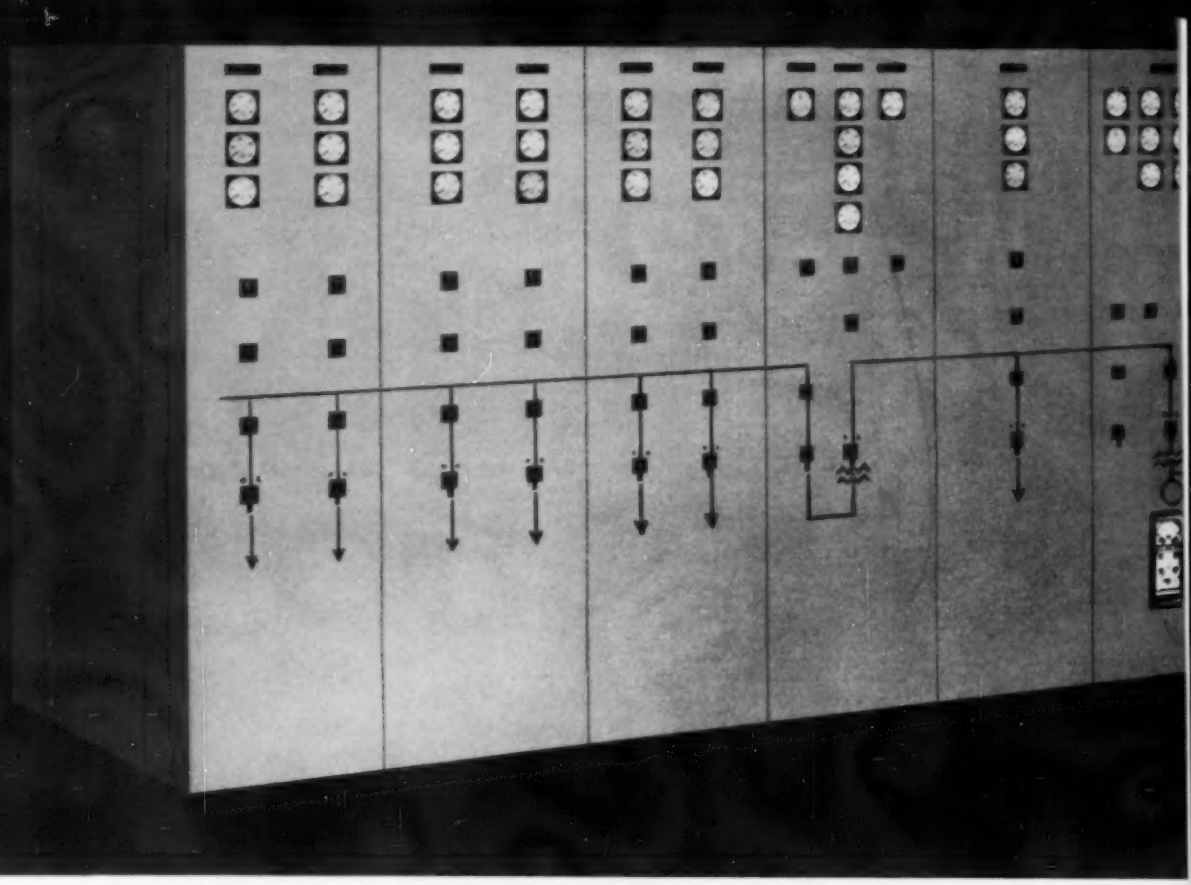
Direct connection gives the lowest metering cost for 480-v, 3-phase, 3-wire service, reported W. H. Farrington, Texas Electric Service Co. But lightning damage is high compared with 240-v experience in their service area. Tests on ungrounded delta systems also show sustained phase-to-ground voltages up to 800. Transformer-connected metering overcomes these difficulties in present practice, he continued, but wider use of 480 v will undoubtedly promote self-contained metering.

Discussion revealed that 16 other utilities use self-contained 480-v meters while 31 use instrument transformers. One utility looks to socket mounting to reduce trouble rate of self-contained meters.

Mechanization Cuts Shop Cost

New facilities with production-line testing of 15-amp, 3-wire, socket meters may earn 30% on investment for Consumers Power Co, reported Adolph Rauth. Nearly 90% of electric meters on the system are already of this type. Conversion of older indoor installations to outdoor socket metering is scheduled at 10,000 per year to extend the savings, he added. Savings come from more efficient use of personnel, building space, and meter stocks.

Palletizing of meter shipments and warehousing pays well, said W. D. Lindsay, West Penn Power Co. Three manufacturers ship on pallets carrying 48 to 144 meters, he continued. But one discusser suggested that these pallets be more sturdy for safe shipment and several doubted that savings could justify purchase of lift trucks for the smaller meter operations. A ballot revealed that paper cartons remain the preferred shipping container.



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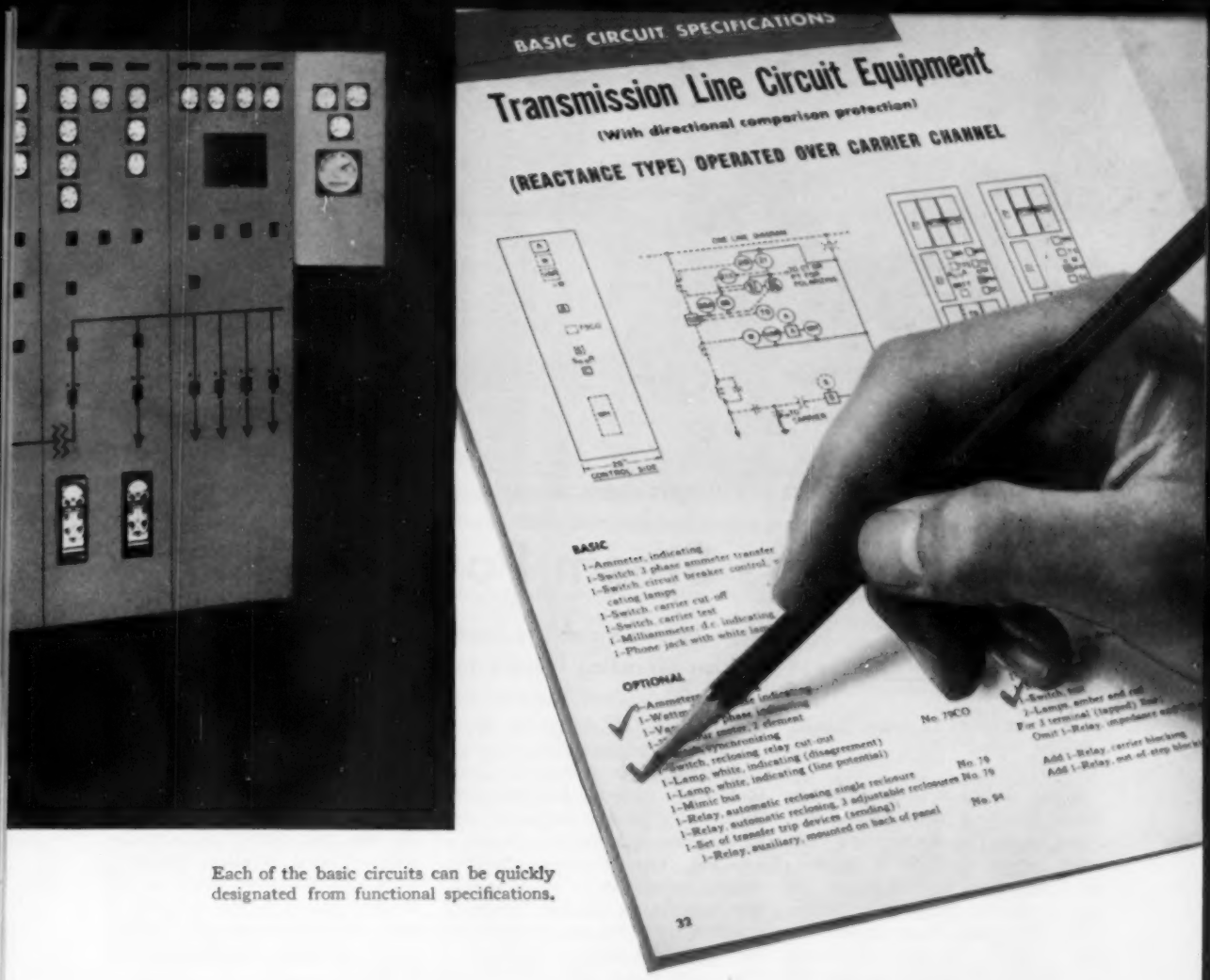
7. Small A-C Generator
8. Large A-C Generator
9. Unit Generator—Transformer
10. Bus Differential Protection
11. Synchronizing Equipment

Selecting the Functions Designs the Switchboard

These eleven basic circuits cover applications for the great majority of switchboard users. After the functions of the board are selected, it is only necessary to select the desired options from standard specifications for complete physical and electrical design of the switchboard. The model shows the attractive physical arrangement of the components on the control side of a basic circuit switchboard. Similarly, devices on relay side are lined up both horizontally and vertically to meet modern appearance design requirements. Components of a circuit group on control and relay sides are arranged directly opposite each other for operating simplicity.



Each of the basic circuits can be quickly designated from functional specifications.

switchboard design

General Electric has recently announced a new "basic circuit" concept in switchboard design. Developed by the Company's Medium Voltage Switchgear Department after extensive research with users of switchboards, this new approach *applies basic circuits —pre-engineered and time-tested functional circuits —to the design of switchboards.* Each basic circuit includes all instruments, meters, control devices and relays necessary to perform the desired function.

This new development offers high quality custom switchboards from "Building-Block" basic circuits.

Important advantages are:

1. Switchboard operators can easily visualize circuit arrangement.
2. Reliable time-tested circuits.
3. Long hours of detail planning saved.
4. Reduced over-all procurement effort and time.
5. Determine size of switchboard before ordering.

For detailed information about this latest switchboard development write for Bulletin GEA-4127, General Electric Company, Schenectady 5, N. Y. 311-11

Progress Is Our Most Important Product

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CENTRAL PLANT EQUIPPED WITH FOUR 13.8-KV TURBOGENERATORS REPLACES MANY SMALL DIESEL-ELECTRIC UNITS

Okinawa Gets Steam Power Plant

SYSTEM ENGINEERING
Planning

Army installs 4 small turbogenerators to empower 69-kv transmission extending radially to 7 important island load centers

W. F. PINCKERT, Supervising Engineer, Okinawa Engineer District

Steam turbogenerators have replaced numerous small local diesel-engine generators in Okinawa's basic utility system. Early in its construction program the Army Corps of Engineers realized that central station power and a network of transmission lines would be the most economical and reliable means of meeting the island's growing demand.

Large centralized diesel units were ruled out. Furthermore, the nature and estimated growth of the insular load indicated that best results would be obtained with four smaller rather than two or three larger turbogenerators.

Military Biggest Customer

The steam plant feeds power into a 69-kv transmission system extending radially to seven principal load centers where automatic underload step-regulated transformers have been installed. These unattended substations distribute power at 13.8 kv. While power loops are at present geographically impracticable, the Corps feels that a high-line loop may yet be desirable, depending upon the location and future expansion of military and civilian needs.

As funds for the plant and system were allocated from United States government appropriations for aid and relief in occupied areas (GARIOA), present facilities were designed for the dual purpose of supplying power for revitalizing the native economy and producing revenue through power sales to American military installations. Present firm commitments for power amount to 34,500 kw, comprising about 70% military, 10% commercial, and 20% native consumption.

Okinawans Get Training

A dearth of trained personnel made operation of the new steam plant under Okinawan management impracticable in the beginning. Plans are to turn these facilities over to Okinawans after they have had sufficient training under American auspices. With this relinquishment in view, the plan layout and scheme of operation were made as simple as was consistent with operating efficiency. Meanwhile, native personnel are being prepared to operate the plant and transmission system. The initial shortage of manpower launched this program as on-the-job training.

The steam plant was planned on the unit system. Connections among boilers, turbines, and auxiliaries are completely symmetrical, each assembly being identical with its neighbor. This plan facilitates interchangeability of parts, including pipe and fittings.

Main units are rated 13.8 kv, 13,529 kva, 85% power factor, 3,600 rpm, and 60 cps. Throttle steam conditions are 600 psig, 825F, corresponding with preferred standard condensing steam turbogenerators. Each unit has direct-connected exciters and pilot exciters. Fire protection is an automatically operated and regulated CO_2 system.

Boilers are oil fired with steam-atomizing burners and automatic combustion control. Three flashed and one contact-type heater comprise the feed water heating installation. Deaeration is by means of the second heater above the hot well. There are drain coolers at the flashed heater preceeding the deaerator and at the first heater above the hot well.

Most Equipment Japanese

The upper drain cooler improves the thermal efficiency of the flashed heaters, and the lower one recovers heat from the drains, thus eliminating need for a drain pump. Boiler feed pump suction is taken from the deaerating heater represented by the second heater above the hot well.

Each boiler has a separate evaporation unit supplying feed water makeup. Each unit consists of two multiple-loop type evaporators arranged for op-

eration in single or double effect. A single duplex unit, using synthetic zeolites, supplies the plant with soft water for makeup evaporation. Except boiler drums, oil burners, and automatic combustion control, all equipment is of Japanese manufacture.

Typhoon-Proofing Needed

Boiler feed pumps, condensation pumps, induced and forced-draft fans, and other plant auxiliaries are electrically driven. Start-up power is derived from a nearby diesel electric generating plant.

The prevalence of typhoons requires special precautions for protecting equipment from being swamped or drowned by heavy rains. At wind velocities of 120 mph and bursts at higher speed, rain is driven almost horizontally with such force as to penetrate conventional louvers or ventilators. Special designs of "typhoon-proof" construction are employed.

Motors are wound with fungus-inhibiting insulation, and outdoor switchgear cubicles have heaters to prevent corrosion by reducing relative humidity.

Humidity Is Problem

The switchboard and control room are placed centrally and symmetrically in relation to the main units. The building is T-shaped, with the control room in the short broad stem of the T. A double, soundproof, glazed partition between the control room and main floor affords a sweeping view of the turbogenerator floor. Operation may be accomplished from just two levels, the turbine floor and the condenser floor.

The control room section is insulated from the main building to prevent transmission of vibration from the main units and for reasons of structural seismic design. This section also houses the office, laboratory, station service transformers and switchgear, storeroom, and machine shop. The switchboard room, office, and laboratory are air conditioned for protection against dust and the corrosion of the semi-tropical humid climate.

Condensing Water Nearby

Locating the plant with respect to the electrical load center seemed no particular problem, as sea water for condensing was close at hand virtually everywhere. But the surface water on the island-rimmed coral reef was 10 to 15F warmer than deep water just beyond the reef. For optimum efficiency, the cold deep water would have to flow from beyond the reef to the plant without mixing with warmer water.

CENTRALIZED CONTROL ROOM IS AIR CONDITIONED AGAINST HUMIDITY

Site Problem Met

Test borings to determine foundation conditions revealed another problem at the plant site. Underlying coral, although appearing quite homogeneous near the surface, was in reality quite cavernous and interspersed with laminations of clay and coral sand. Study of the geology of the test borings pointed to the best possible orientation within the area.

Excavation requirements were reduced in the area of turbogenerators and building foundations by placing the sea water intake channels and condenser circulating water pumps outside the main building. Main intake sea water screens are the rotary traveling type, and channels to the pumps are so constructed that auxiliary fine-mesh screens may be installed near each condenser pump intake when necessary.

Lines Have Steel Towers

Intake channels are open to permit inspection and clearing of marine growth. For the removal of marine growth, cast-iron pipe connections from the pumps to the condensers may be lanced by steam jets. Condenser circulating water pumps in an underground gallery are of the horizontal, double-suction, volute-casing type. These may be taken to the machine shop for maintenance and repair on an overhead trolley.

Transmission lines were designed to withstand winds of typhoon velocity. Four-leg steel towers supporting single, approximately symmetrically displaced 3-phase circuits were found best for prevailing conditions.

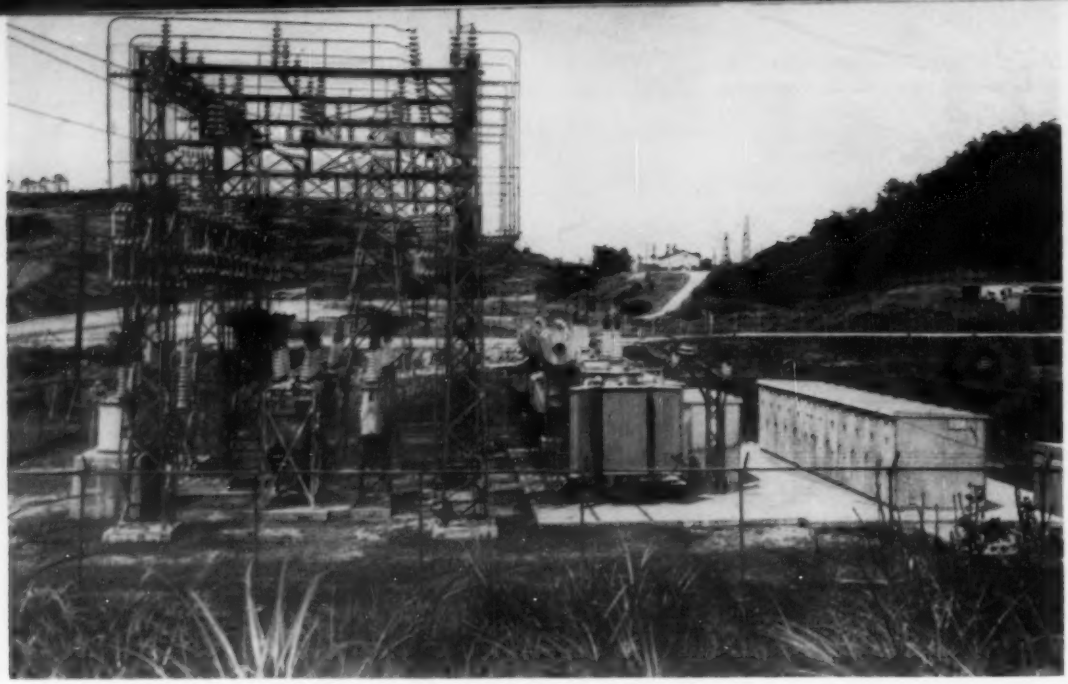
Transformers connected delta-delta in the substations have zero phase selective ground relays to protect feeders against phase-to-ground faults. Overload relays protect against phase-to-phase short circuits. Automatic reclosing equipment, housed in steel typhoon-proof cubicles, may be adjusted for lockout after one, two, or three breaker reclosures. High-voltage oil circuit breakers permit switching a station off the line and protect transformers against internal faults through differential relays.

Economy Shows Growth

Whenever practicable, factory preassembled units were used. Equipment was tested thoroughly at the factory under simulated operating and weather conditions before shipment.

Before the war, Naha, Okinawa's principal city, had a central steam generating plant. The plant consisted of British-built Parsons turbines and coal-fired, chain-grate boilers operated at 450-psi steam pressure. Power was generated at 3-phase, 50 cps, 3000 v. Generators and power plant auxiliaries were also of British manufacture. These were totally destroyed during the war, along with the narrow-gage steam railway system connecting Naha with the principal outlying villages. The city also had an electric street railway system.

The economy of the Ryukyu Islands



AUTOMATIC SUBSTATIONS step down transmission voltage to 13.8 kv for distribution. Automatic reclosing units are in typhoon-proof cubicles on the right

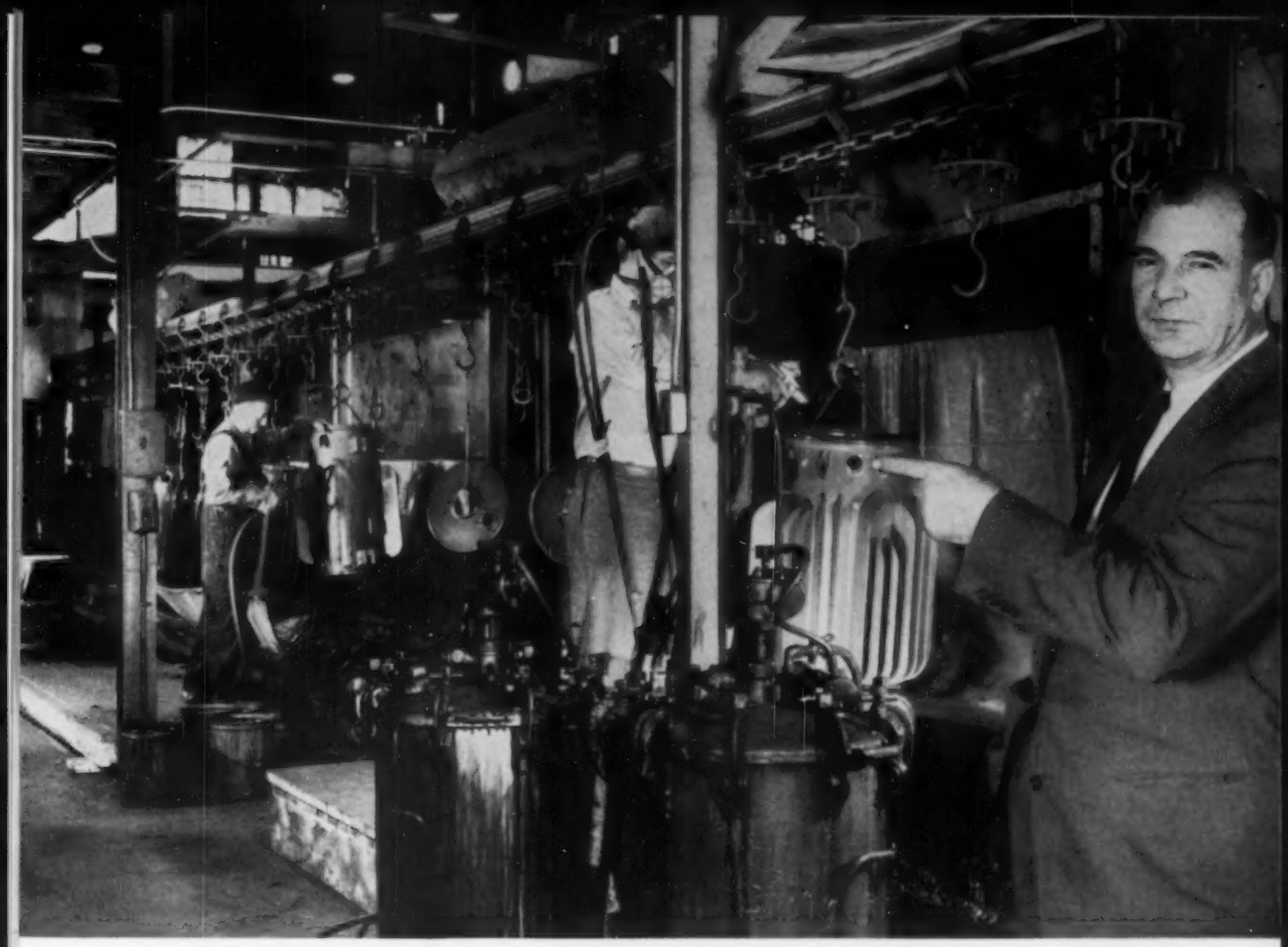
RADIAL SYSTEM of 69-kv transmission lines serving seven load centers was designed for winds of typhoon velocity. Four-leg steel towers serve best on the line

is showing remarkable growth, but there are foreseeable limits to its needs. Appliances considered standard in the U.S. are beyond the financial reach of the average Ryukyuan household. It would probably be content with a few electric lights and an electric iron. In a climate much like that of Florida, the natives find no need for heating.

Future Needs Studied

As Okinawa is not an exporter of finished goods, most factories supply local needs. Noteworthy among these are a raw sugar refinery, a fish freezing plant, and an ice plant. Processing of forest products into finished building materials, fine cabinets, and furniture has grown remarkably, and the Ryukyuans are famous for their handicraft industries, particularly ceramic and lacquer ware. These processes require very little power.

Load forecasting cannot be accomplished by extrapolating trends from the past. Power demand will depend on U.S. military strength and Okinawan prosperity, and to some degree on the influence of the U.S. appliance market. As the Corps expects that the combined military, native, and commercial loads will exceed the firm power capacity of the present steam plant in the not-too-distant future, it has begun studies on how to supplement this capacity.



Jim Ford, Manager, Materials Engineering, Transformer Division, explains this

FACT: Coastal Finish clinches corrosion resistance of new transformers

Coastal Finish touch-up paint . . . now available in easy-to-use spray can

Exclusive Coastal Finish plus the elimination of all vulnerable hardware on the new Westinghouse pole-type transformer solves your corrosion problems. Tests, subjecting transformers to 10,000 hours' saturated salt spray, prove that Coastal Finish lasts twice as long as ordinary paints. It also sheds the destructive effects of acids, alkalies, oxygen and ultraviolet light.

Twice the protection means twice the maintenance savings—with this new line of Westinghouse transformers.

• • •

Facts can be demonstrated . . . call The Man With The Facts, your Westinghouse Sales Engineer, or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-70746

YOU CAN BE SURE...IF IT'S

Westinghouse

Helping the industry meet its growing loads

Men . . . not bricks and steel . . . make this laboratory great

Westinghouse has cut another ribbon! This time, we opened the doors at the Steam Division's new development laboratory near Philadelphia. Millions of dollars have been invested so that advanced development can bring you even greater value for your turbine dollar.

But it takes more than bricks and steel to build a great laboratory. It takes capable men. While the physical facilities here are equal to any in the world, the scientists and engineers now at work hold the real promise of great things to come from this project.

On the laboratory staff are men who are real leaders in prime mover development. Among them are those who brought you such famous Westinghouse developments as solid-forged rotors, stainless steel blading and the widely acclaimed Westinghouse governing system.

You will benefit from the laboratory through Westinghouse contributions to such organizations as AIEE and ASME. The laboratory will also bring you direct benefits—new and more advanced Westinghouse power plant equipment supplying more power at less cost and with greater dependability. J-37186-B

YOU CAN BE SURE...IF IT'S
Westinghouse

The new laboratory

Advanced development on turbine and heat transfer equipment will be conducted at the $6,000,000 Westinghouse engineering development laboratory in Philadelphia. This modern 4-story structure contains 40,000 square feet of laboratory space and is staffed by over 100 engineers and technicians. Facilities are the most modern that could be provided and include scientific apparatus from electronic computers to devices for handling radioactive isotopes.

Super-critical pressure

As the result of development work by the men who are staffing the new laboratory, the world's most efficient turbine with its surface condenser and feedwater heaters is now on order for Philadelphia Electric Company. The turbine is a 275,000-kw, super-critical pressure unit designed for 5000 psi, 1200°F—highest pressure and temperature ever projected.

Gas turbines

Relative newcomers in the prime mover field, gas turbines show promise of becoming one of the industry's important future sources of power. New applications and improved efficiencies are some of the many development projects being advanced by the engineers at this new Westinghouse facility.

Westinghouse Research Center—

providing the wealth of fundamental knowledge that is carefully directed into industry advancements by the many Westinghouse development laboratories. Vital to Westinghouse emphasis on industry progress, this new Research Center will be the finest facility of its kind.

NEWS ABOUT PEOPLE

NPG Appoints Chairman

Nuclear Power Group, Inc, has named Raymond D. Maxson chairman of the operating committee. Maxson, senior vice president of Commonwealth Edison Co, succeeds Titus G. LeClair, assistant to the vice president of the Chicago utility.

The NPG operating committee has been increased to eight members, one for each company in the group. They are: R. D. Maxson, chairman; James M. Landis, vice president, Bechtel Corp; S. N. Fiala, chief engineer, American Gas & Electric Service Corp; Q. W. Wellington, power superintendent, Central Illinois Light Co; S. L. Hilyard, assistant vice president, Illinois Power Co; J. A. Keeth, vice president, Kansas City Power & Light Co; C. C. Whelchel, chief, Steam Engineering Division, Pacific Gas & Electric Co; and Stanley Stokes, vice president, Union Electric Co of Missouri.

Maxson was elected vice president in charge of engineering and operation for Commonwealth Edison in 1952. Early this year he was advanced to senior vice president.

R. D. MAXSON

AIEE Names General Committee Heads

The 1955-56 chairmen of the 24 general committees of American Institute of Electrical Engineers have been announced by Morris D. Hooven, president of the Institute.

Much of the important work of AIEE is carried on by the general committees, while technical aspects of the organization come under the scope of its 48 technical committees.

The 1955-56 general committee chairmen are:

Board of Examiners—**R. A. Heising**, Summit, N. J.
Code of Principles of Professional Conduct—**P. L. Alger**, General Electric Co
Constitution & By-Laws—**E. S. Lammers, Jr**, Westinghouse Electric Corp
Education—**Guy Kleis**, Westinghouse Electric Corp
Edison Medal—**E. P. Yerkes**, Bell Telephone Co of Pennsylvania
Charles Legeyt Fortescue Fellowship—**G. E. Moore**, Westinghouse Electric Corp
Finance—**J. P. Neubauer**, Consolidated Edison Co of New York, Inc
Headquarters—**L. F. Stone**, General Electric Co

Management—**L. R. Gaty**, Philadelphia Electric Co
Membership—**W. E. Scholz**, Philadelphia Electric Co
Members for Life—**C. L. Dawes**, Harvard University
Planning & Coordination—**L. F. Hickernell**, Anaconda Wire & Cable Co
Prize Awards—**W. R. Brownlee**, Southern Services, Inc
Publications—**W. Scott Hill**, General Electric Co
Public Relations—**Fischer Black**, Electrical World
Research—**J. E. Hobson**, Stanford Research Institute

Sections—**Dixon Lewis**, Aluminum Co of America
Registration of Engineers—**E. R. Whitehead**, Illinois Institute of Technology
Safety—**H. B. Whitaker**, Underwriters Laboratories, Inc
Standards—**A. C. Muir**, Berwind White Coal Mining Co
Student Branches—**W. B. Morton**, Pennsylvania Power & Light Co
Transfers—**R. G. Warner**, United Illuminating Co
Technical Operations—**J. D. Tebo**, Bell Telephone Laboratories
Volta Scholarship—**H. S. Osborne**, Upper Montclair, N. J.

(*Continued on page* 39)

A. HEALEY

NJP&L Secretary

New Jersey Power & Light Co has elected Alfred Healey secretary and assistant treasurer. He succeeds the late Norman L. Nelson who had occupied the post for the previous seven years.

For the past two years Healey has been secretary and assistant treasurer of General Public Utilities Corp, New York City, parent company of New Jersey P&L.

A business administration graduate of Boston University, Healey has held similar posts with other electric utilities.

America's Finest Porcelain..

for Special Applications . . .

VICTOR

Purified Porcelain

Victor "know-how" has made many contributions to insulator progress. None is as important as *Purified* Porcelain. By instituting demineralization of water, modern microscreening, infrared drying, black light inspection, continuous electrical testing and many other advances, VICTOR gives you the finest insulator porcelain ever made!

VICTOR *Purified* Porcelain is ideal for special applications such as molded, extruded, and turned shapes. It has vastly greater uniformity in mechanical and electrical strength values, higher puncture voltage values, greater density, hardness and durability.

Our engineering, design and manufacturing facilities are ready to help you with specialized insulator problems. Write us.

FEATURES OF PURIFIED PORCELAIN

- Greater hardness and density
- Greater resistance to impact
- Greater thermal resistance
- Higher average puncture values
- Higher mechanical strength
- Takes a smoother, harder glaze
- Uniformity of quality available in no other porcelain

For the full facts on VICTOR "know-how," write for "The Story of Victor and Purified Porcelain." For engineering data on Victor's complete line of standard transmission and distribution insulators, write for Bulletin No. 4.

NEWS FROM VICTOR

With the completion of a brand new addition to its plant last year, Victor has almost doubled the area devoted to bushing and special porcelain manufacture. The new building was made necessary by increasing demands for special porcelain shapes made of Purified Porcelain.

SPECIFY VICTOR

Purified Porcelain Special Insulators

VICTOR INSULATORS DIVISION
I-T-E CIRCUIT BREAKER CO.
VICTOR, N. Y.

Low and High Voltage Pintypes • Suspensions • Guy Strains
Spools • Switch and Bus Insulators • Custom Designed Porcelain
Insulator Hardware

Load Break SWITCH AND FUSE UNITS

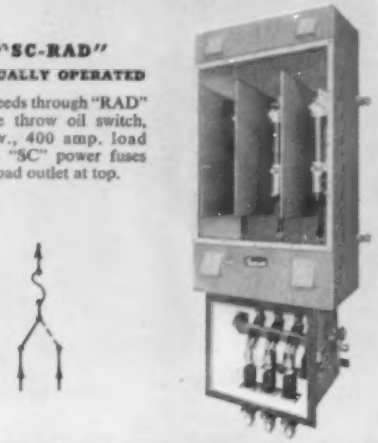
Save Space, Installation Labor and Equipment Cost

The advantages of G&W oil fuses and oil switches for primary cable service entrances have been proved by over 20 years of satisfactory operation by many electric utilities:
LOAD BREAK–SMALL SPACE–MINIMUM MAINTENANCE–LOW COST–VERSATILE FORMS.

"RA" OIL SWITCHES WITH "SC" POWER FUSES.

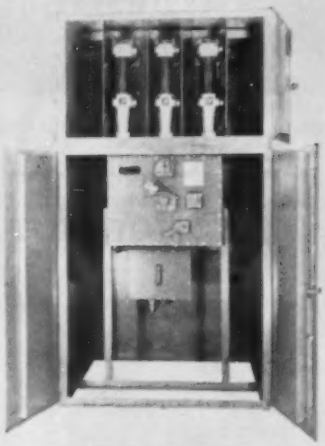
"SC-RAD"
MANUALLY OPERATED

Two feeds through "RAD" double throw oil switch, 15 Kv., 400 amp. load break. "SC" power fuses with load outlet at top.



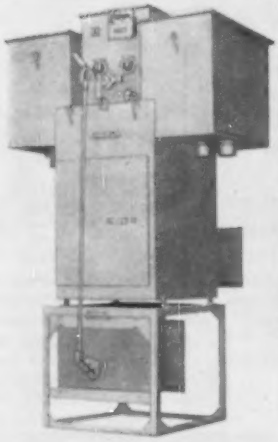
"SC-RDA"
AUTOMATIC THROWOVER MANUAL THROWBACK

"RDA" double throw oil switch 7.5 Kv., 400 amp. load break. Model "A" automatic throwover mechanism. "SC" power fuses 5 Kv. All enclosed in cubicle having hinged doors and keylocks.



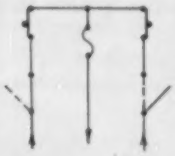
"SC-RAD-F"
AUTOMATIC TRANSFER

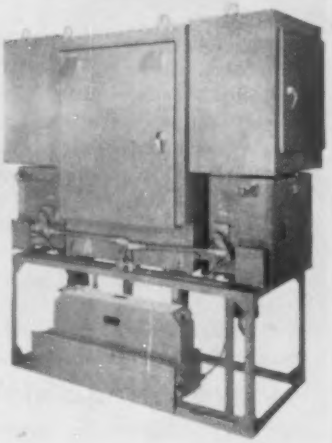
Two feed circuits, each loops through boxes on each side at top. "RAD" double throw oil switch, 15 Kv., 400 amp. load break with Model "F", automatic transfer mechanism. "SC" power fuses in middle cabinet with throat in back for direct attachment to transformer.



"SC-DRA-E"
AUTOMATIC TRANSFER

Two single throw "RA" oil switches, 15 Kv., 400 amp. load break. Isolating links between oil switches and "SC" power fuses. Model "E" automatic transfer mechanism.





G&W combination fuse-switch units are functionally designed for compactness and minimum cost. When required, they can be enclosed in rectangular cubicles to match other equipment. (See upper right hand illustration)

Send an outline of your problem for our recommendations.

MAIN OFFICE AND FACTORY **G & W ELECTRIC SPECIALTY CO.**

7780 Dante Avenue **Chicago 19, Ill., U.S.A.**

CD552

H. M. TURNER

CEMA Elects Turner President

Harold M. Turner was elected president of Canadian Electrical Manufacturers Association at its 11th annual meeting held recently at Niagara Falls. Chairman of the board for Canadian General Electric Co, Turner succeeds Kenneth V. Farmer, vice president and general manager of Canadian Ohio Brass Co, Ltd, as president of CEMA.

Turner has been associated with General Electric Co and its Canadian subsidiary since 1921. After serving CGE as controller, vice president, and president, he was elected chairman early this year.

Farmer went to Canada in 1931 as manager and director of Canadian Chio Brass Co, Ltd. In 1946 he was named vice president and director of the Canadian company. He has been a director of the U. S. company since 1950.

Square D Makes Top Level Changes

Square D Co has appointed L. W. Mercer senior vice president. Other top-level changes boosted Henry S. Morgan to financial vice president and secretary, James S. Vaughan to vice president-Distribution Equipment Division, and T. R. Oakes to treasurer and assistant secretary.

Before these appointments, Mercer served as executive vice president, Mor gan was secretary-treasurer, Vaughan was general manager of Distribution Equipment Division, and Oakes was assistant treasurer and assistant secretary.

L. W. MERCER

H. S. MORGAN

J. S. VAUGHAN

The posts to which Mercer, Morgan, and Vaughan have been promoted are newly created. The executive vice presidency will not be filled at this time.

In 37 years with Square D, Mercer has served as purchasing agent, general manager of Detroit plant operations, and, since 1952, executive vice president of the company.

PERSONAL BRIEFS

Walker L. Cisler, president of Detroit Edison Co, has been named to a special eight-man commission by U. S. government to make a broad reappraisal of disarmament policy.

Harold S. Vance, chairman of executive committee of Studebaker-Packard Corp, has been named to Atomic Energy Commission by the President. If approved by Congress, Vance will fill the vacancy created several months ago by resignation of **Joseph T. Campbell,** now Controller General.

New president of American Standards Association is **James R. Cranwell,** vice president of Pennsylvania Railroad. He succeeds the late **Edward T. Gushee,** vice president of Detroit Edison Co.

Ralph D. Jennison will retire as board chairman of New York State Electric & Gas Corp Dec. 31 but will remain a director . . . **C. M. Cavner,** assistant vice president of Southern California Edison Co, retired this month.

Named chairman of Connecticut Development Commission is **Robert P. Lee,** area development manager of Connecticut Light & Power Co . . . **Charles W. Smith** has retired as chief, Bureau of Accounts, Finance and Rates, Federal Power Commission and has opened offices as a consultant in public utilities, accounting, and taxation at Baltimore, Md.

Ebasco Services, Inc, has promoted **M. G. Kennedy** from assistant manager to manager of the sales, marketing, and public relations department. Ebasco also has named **R. B. Chase** general purchasing agent and **W. T. Hamilton** purchasing agent.

Carlisle P. Myers has been named general counsel and **Leonard E. Kust,** general tax counsel for Westinghouse Electric Corp.

OBITUARY

Edward M. Cobb, 63, manager of Ohio Power Co's residential sales department, died recently at Canton, Ohio. His 46 years with the utility ranked him as oldest employee in point of service with Ohio Power and its parent American Gas & Electric Co.

Get More for Your

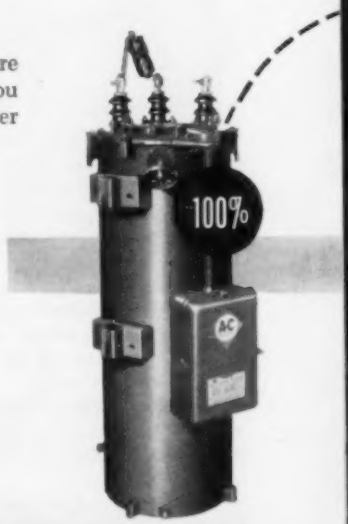
Vari-Amp Feature Gives You 5 Ratings in 1

No Need to Change Regulators as Loads Grow when Allis-Chalmers distribution regulators are on your system. The *Vari-Amp* feature lets you step up ratings as much as 60% by reducing the range of regulation.

Here's how it's done: Reduce the range of regulation on a step-type regulator and you can increase current-carrying capacity. The *Vari-Amp* feature provides stops that limit range of regulation in five 1¼% steps from ±10% to ±5%.

Fits Varying Requirements

You get considerable flexibility because the *Vari-Amp* feature permits using unequal ranges of regulation. Set what you need — for example, 6¼% raise at 135% current, 10% lower at 100% current.



No Extra Cost

Best of all, you get this convenient feature on Allis-Chalmers distribution regulators at no increase in cost. You get more uses for each regulator.

Get complete information on how the *Vari-Amp* feature can help you stretch your regulation dollar. Call your nearby A-C office or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin. A-4811

Originators of 5/8% Step Regulation

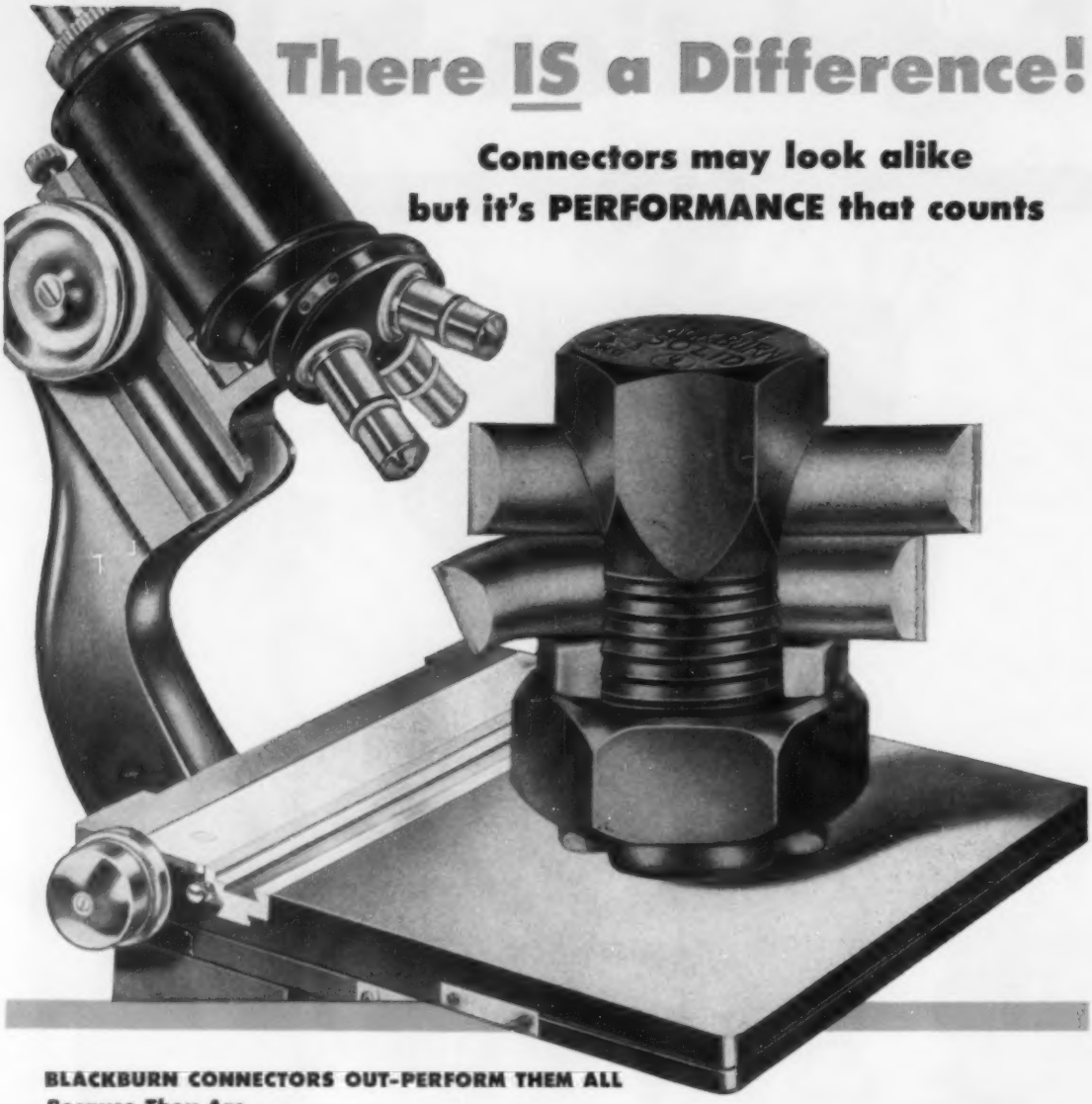
ALLIS-

Regulation Dollar

CHALMERS

There IS a Difference!

Connectors may look alike but it's PERFORMANCE that counts



BLACKBURN CONNECTORS OUT-PERFORM THEM ALL

Because They Are . . .

BETTER MECHANICALLY

- Made of high strength duronze, a silicon bronze alloy stronger than structural steel.
- Machine cut threads, *CFC treated, provides more thread engagement —reduces friction and increases thread efficiency. *Chemical Friction Control.
- Rigid inspection of each production operation assures uniformly good connectors.

BETTER ELECTRICALLY

- High clamping force—the result of greater thread efficiency breaks down oxide on the conductor improving conductivity.
- Higher initial conductivity, actually greater than an equal length of conductor is maintained permanently.

REUSABLE

- Selection of proper high-strength, corrosion-resistant materials—plus precision workmanship and inspection—means Blackburn connectors may be used over and over.

AVAILABLE AT ELECTRICAL WHOLESALERS EVERYWHERE

BLACKBURN *Hi-Strength* CONNECTORS

JASPER BLACKBURN CORP., 35 Madison Street, St. Louis 6, Missouri • Phone MAin 1-2821

MEETINGS CALENDAR

An extended list of coming meetings appears in the last issue of each month

OCTOBER

AMERICAN STANDARDS ASSOCIATION—jointly with the National Bureau of Standards, 6th National Conference on Standards, Sheraton-Park Hotel, Washington, D. C., Oct. 24-26.

NATIONAL ASSOCIATION OF RAILROAD AND UTILITIES COMMISSIONERS—67th Annual Convention, Grove Park Inn, Asheville, N. C., Oct. 24-27.

NATIONAL INDUSTRIAL CONFERENCE—Special Atomic Energy Conference, Waldorf-Astoria Hotel, New York, Oct. 26-28.

PENNSYLVANIA ELECTRIC ASSOCIATION—Electrical Equipment Committee, Hotel New Yorker, N. Y., Oct. 27-28; Relay Committee, Pocono Manor Inn, Pocono Manor, Pa., Oct. 31-Nov. 1.

SOUTHEASTERN ELECTRIC EXCHANGE—Sales Conference, Biltmore Hotel, Atlanta, Ga., Oct. 27-28.

THE MAGNESIUM ASSOCIATION—Eleventh Fall Meeting, Hotel Biltmore, New York, N. Y., Oct. 31-Nov. 1.

NOVEMBER

NATIONAL ASSOCIATION OF CORROSION ENGINEERS—Northeast Region Fall Meeting, Hotel Niagara Falls, Niagara Falls, N. Y., Nov. 1-3.

ASSOCIATION FOR APPLIED SOLAR ENERGY—World Symposium on Applied Solar Energy, Westward Ho Hotel, Phoenix, Ariz., Nov. 1-5.

* **EDISON ELECTRIC INSTITUTE**—Taxation Accounting Committee, sponsored jointly with American Gas Association, Plaza Terrace Hotel, Cincinnati, Ohio, Nov. 3; Accident Prevention Committee, Beaumont Hotel, Beaumont, Tex., Nov. 13-18; Commercial Lighting Committee, Terrace Plaza Hotel, Cincinnati, Nov. 16-17; Industrial Relations Committee, Joint Meeting with New England Personnel Group, Somerset Hotel, Boston, Nov. 17-18.

PACIFIC COAST ELECTRICAL ASSOCIATION—Business Development Section Annual Conference, Huntington-Sheraton Hotel, Pasadena, Calif., Nov. 3-4; Hawaiian Section Conference, Reef Hotel, Honolulu, Nov. 9-10; Administration Services Section Meeting, California Hotel, Fresno, Calif., Nov. 16-17.

CONTROLLERS INSTITUTE OF AMERICA—24th Annual Conference, Hotel Statler, Los Angeles, Nov. 6-9.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS—Eastern Joint Computer Conference, Hotel Statler, Boston, Nov. 7-9; Diamond Jubilee, Congress, Hilton & Blackstone Hotels, Chicago, Ill., Nov. 13-18.

INDUSTRIAL MANAGEMENT SOCIETY—19th Annual Time and Motion Study and Management Clinic, Sherman Hotel, Chicago, Nov. 9-11.

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION—Annual Meeting, Traymore Hotel, Atlantic City, Nov. 14-18.

CHICAGO EXPOSITION OF POWER & MECHANICAL ENGINEERING—Chicago Coliseum, Nov. 14-18.

ASSOCIATION OF EDISON ILLUMINATING COMPANIES—Cable Engineering Section, Bellevue-Stratford Hotel, Philadelphia, Nov. 17.

NATIONAL INDUSTRIAL CONFERENCE BOARD—Bellevue-Stratford Hotel, Philadelphia, Nov. 17.

INTER-INDUSTRY FARM ELECTRIC UTILIZATION COUNCIL—2nd Annual National Power Use Workshop, Chase & Park Plaza Hotels, St. Louis, Mo., Nov. 28-30.

ELECTRIC COMPANIES ADVERTISING PROGRAM—Copy Group Meeting, Ayer Studio, New York City, Nov. 30.

AIR CONDITIONING & REFRIGERATION INSTITUTE—9th Air Conditioning & Refrigeration Exposition, The Auditorium, Atlantic City, N. J., Nov. 28-Dec. 1.

DECEMBER

AMERICAN SOCIETY OF REFRIGERATING ENGINEERS—51st Annual Meeting, Hotel Traymore, Atlantic City, Dec. 1-3.

NATIONAL ASSOCIATION OF COST ACCOUNTANTS—Fairmount Hotel, San Francisco, Dec. 2-3.

AMERICAN WATERSHED COUNCIL, INC—Second National Watershed Congress, Statler Hotel, Washington, D. C., Dec. 5-6.

INTERNATIONAL EXPOSITION—25th Exposition of Chemical Industries, Convention Hall, Philadelphia, Pa., Dec. 5-9.

ENGINEERS JOINT COUNCIL—Nuclear Engineering & Science Congress, Public Auditorium, Cleveland, Dec. 12-16.

* **EDISON ELECTRIC INSTITUTE**—Customer Accounting Committee, sponsored jointly by American Gas Association, Henry Grady Hotel, Atlanta, Ga., Dec. 8-9.

JANUARY 1956

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS—Winter General Meeting, New York, Jan. 30-Feb. 3.

FEBRUARY

EDISON ELECTRIC INSTITUTE—National Industrial Electric Heating Conference, Netherland Plaza Hotel, Cincinnati, Feb. 6-10.

* **ROCHESTER ELECTRICAL ASSOCIATION**—Electrical Exposition, War Memorial Building, Rochester, N. Y., Feb. 18-25.

AMERICAN SOCIETY FOR TESTING MATERIALS—Committee Week, Hotel Statler, Buffalo, Feb. 27-March 2.

MARCH

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION—Edgewater Beach Hotel, Chicago, March 12-16.

ILLINOIS INSTITUTE OF TECHNOLOGY—18th Annual American Power Conference, Hotel Sherman, Chicago, March 21-23.

*Additions this week.

PUD Spurns Aid Offered for Priest Rapids Dam

The Grant County PUD of Ephrata, Wash., which last year sought approval of the Washington State Power Commission for a Joint Operating Agency to construct the Priest Rapids hydroelectric project on the Columbia River near Ephrata, recently indicated that it believes it can build the $383-million project by itself.

Municipal officials of nearby Ellensburg brought up the matter of an agency at a recent meeting with PUD officials. They indicated they would like to join such an agency, in exchange for a share of the power to be generated. PUD representatives did not dismiss the proposal but greeted it with apparent coolness.

Glenn Smothers, PUD manager, pointed out that legality of the agency would have to be established and doubted that the agency could perform a useful function. Time would be saved if the PUD could proceed by itself, he asserted.

The State Power Commission last year refused to approve organization of the proposed agency, which would have included several PUDs and municipalities. A law passed by the 1955 state legislature made it mandatory for the commission to approve any such agency, but the PUDs apparently no longer are interested.

Cuba Plans New Unit

At the recent dedication of Cuba's largest generator, a 40,000-kw unit, the president of Campania Cubana de Electricidad disclosed plans for a 60,000-kw unit to go into operation in 1957.

MEETING REPORT

Fur Coats, Cars, and Vacations — People Want Them. How Can You . . .

Get 'Em to Buy Appliances First?

Electrical league managers see answer in tighter liason with dealers and distributors, stronger promotional attacks, and all-out war on wiring problem

Amidst today's boomy atmosphere of fat paychecks and tougher competitive markets, electric leagues from the U.S. and Canada this month took a critical look at themselves and their sales efforts. Much of this soul-searching centered around league relationships with two other figures having much the same problem—the dealer and distributor.

Meeting in Toronto, Oct. 5-8, delegates of the International Association of Electrical Leagues heard speakers from other branches of the industry voice their opinions.

What Speakers Said . . .

. . . About Dealers:

"The dealer," declared H. B. Price, Jr. president of National Appliance and Radio-TV Dealers Association, "first of all wants respect." Give him the recognition and importance he deserves. Try to understand his problems and the products he sells. Talk to him in his own language, not in utility language. Help him and provide a cooperative spirit. Don't set yourselves up as experts in the appliance business. I know you will see some dealers who to you appear to run their businesses like jack rabbits. There will be a temptation to criticize. But be careful, it can boomerang."

The need to press sales training was emphasized by Willard Johannsen, editor and publisher of "Electrical Dealer". "Early dealers got their sales training working with utilities," he said. "Today, with most utilities out of merchandising, this kind of training isn't available to those coming up. Leagues can help organize or at least spur training programs.

"The real competition is with other industries, not among ourselves," he continued. "Why aren't people buying more dishwashers? They will, but a recent survey shows they want to buy other things first—a new car, a paid-for vacation, and four or five other appliances."

. . . About Distributors:

Arthur W. Hooper, executive director, National Association of Electrical Distributors, also stressed sales training as a way to better distributor cooperation. "One of the biggest problems the distributor faces today is getting competent sales help," he said. Another suggestion: Continue cooperative promotional ventures. "With everyone pushing the same product at the same time, there is better market penetration. The distributor looks to the league to furnish leadership in this."

. . . About Consumers:

Changes not only in consumer buying habits but in who the consumer is were pointed up by G. Rogers Porter of "Woman's Home Companion." The man more and more is turning over the running of the home to his wife, declared Porter. "And there's a feeling of some that we're not getting our proper share of the dollar this woman spends to gain a better life for her family."

The housewife, he continued, has received "raw deals" from some appliance dealers particularly in the lack of proper servicing and the idea she's getting a discount when many times she's not. "Public confidence is one thing we must value above all else, and the electrical leagues can take a lead in helping to develop this confidence."

"Look Magazine's" Richard Harmel told league managers to be alert to merchandising opportunities that will open up to them in the coming year. Dealers, said Harmel, want and need well-planned campaigns triggered by store-wide promotional themes and materials which "Look" and other magazines offer. He announced that "Look" again this year will sponsor its wiring achievement contest among utilities.

. . . About Wiring:

And as in any conference these days, delegates found they couldn't talk sales without talking wiring.

Albert F. Metz, president of National Electrical Manufacturers Association and board chairman of Okonite Co, had some definite ideas about what the league can do. "Follow up the national publicity that's going on," he said. "Be the one to stimulate local wiring efforts in order that the actual selling to the customer gets done."

There are some, he noted, who would like a "super-collosal" wiring promotion with a "large part of the cash contributed by all concerned."

So far, he said, he had not seen a plan which could satisfy the diverse conceptions of all these interests. His answer: Voluntary programs by each trade body with electric leagues implementing the local selling.

An idea of what leagues are doing to sell wiring was shown by League Managers John A. Morrison of Philadelphia and S. E. Strunk of Cleveland. After six months, Philadelphia's "100-A" program, says Morrison, shows these results: 2,398 100-amp jobs with total 6,000 predicted at the end of the year.

Strunk announced that Cleveland has been doubling its number of certified AW homes every year. He gave these comparisons: 65% of certified homes in his region have electric ranges against 40% for all new homes; 77% have clothes dryers and 34% have dishwashers against 32% and 4% respectively for all new homes.

W. F. Lovelace, residential sales manager for Los Angeles Department of Water & Power, put forth the idea that if you sell wiring, appliances will come automatically. This at least

(*Continued on page* 46)

Research for New Savings in Power Plant Operations

HOW MANY DOLLARS PER INSTALLED KILOWATT?

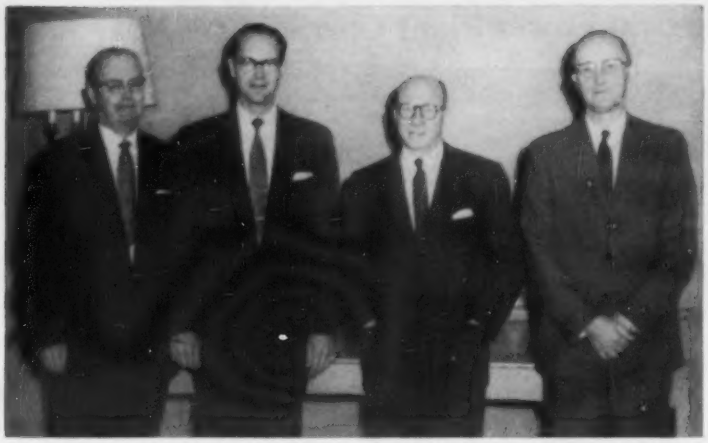
Holding the line on initial costs has been a matter of increasingly great concern to power plant men, particularly in the last several years. That they have made important strides is indicated by the fact that installed costs per kilowatt have not risen in anywhere near the ratio of increases in land and general construction costs.

Several factors have made these savings possible. Many new plants are being erected for outdoor or semi-outdoor operation, thereby eliminating some costly construction. Another important cost-cutting answer involves building large-capacity individual boiler-turbine units which can be housed in smaller structures. Here, boiler design must afford genuine savings in space and volume, and B&W's development of the furnace division wall has been a marked advance in this respect.

Continuing research and engineering development offer the best hope for further progress. In congested urban areas, can older units be replaced when necessary with units of greater power, without requiring more land or larger buildings? Is greater simplification of equipment practical? Can additional use be made of less expensive materials? Can manufacturing techniques be improved to speed shop fabrication and simplify field erection?

Some answers have already been found. Engineering achievements such as the Cyclone Furnace and Pressure Firing are saving on installed costs by eliminating or simplifying such auxiliary equipment as coal pulverizers and piping, various controls, precipitators, ash-handling equipment, induced draft fans, ducts, foundations and similar items. B&W's new Universal Pressure Steam Generator, which has no steam drum, is also an important contributor to savings in space and structural costs.

To many of the questions there are no pat answers. But the inquiring staff of engineers, physicists, chemists, metallurgists, and technicians at B&W's fully-integrated Research Center in Alliance, Ohio, are seeking solutions to many of these problems. Using a vast array of apparatus, they are exploring many sides of many questions in fuels, combustion, steam generation, ceramics, heat transfer and metallurgy, to help find ways of making power cheaper and more abundant. The Babcock & Wilcox Company, Boiler Division, 161 East 42nd Street, New York 17, N. Y.



NEW IAEL OFFICERS elected at Toronto: E. J. McGinnis, left, president; Don Rosenthal, vice president; Glen Logan, treasurer; J. G. Waddell, secretary

(*Continued from page* 44)

is followed in LA where specialty salesmen work with tract builders, architects, electrical dealers, contractors, and lending institutions. Department gives illuminated signs, other promotional aids to cooperating builders. Dealers get home purchasers as prospects. Direct mail pieces go to new home owners, and dealer relations men make calls to qualify them as prospects for dealers. Results in seven months: Commitments for 1,250 built-in ranges, 250 dryers, 400 dishwashers, and 32 air conditioners.

Notes from Meeting

• Color TV sales should hit rate of one million sets per year by 1958 and five million per year after 1960, said Ricardo Muniz, manager of Television-Radio Division, Canadian Westinghouse Co, Ltd. Darker rooms will be desirable for viewing color TV, he said, to offset color dilution.

• Rhode Island's Certified Lighting Bureau after one year's operation had certified 57 jobs with a total of 3,707 fixtures and a connected load of 677 kw. Lawrence Messick, National Lighting Bureau manager, invited leagues to join in the bureau's program to upgrade commercial-industrial lighting through certification and contractor education.

Convention was the IAEL's 20th, and the first it had held outside U. S. borders. President Herbert E. Cook, manager of Electrical Association of Detroit, sounded the meeting's keynote with a plea for continued U.S.-Canadian cooperation and perpetuation of their unique relationship. This extends today, he said, not only to a common language and common economic interests, but to the kilowatthour through international interchange of electric power.

IAEL elected E. J. McGinnis, manager of Cincinnati Electrical Association as its new president. Other officers: Don E. Rosenthal, St. Louis Electrical Board of Trade, vice president; Glen L. Logan, Electric League of Los Angeles, treasurer; and John G. Waddell, The Electric Institute (Boston, Mass.), secretary. Other members of the board of governors: C. C. Simpson, The Electric Association, Chicago; John F. Mowatt, Electric Service League of Ontario, Inc, Toronto; Ralph B. Hubbard, Rocky Mountain Electric League, Denver; William H. Johnson, Appliance Merchandisers Association, Phoenix, Ariz.; and William Freudigman, Electric League of Rhode Island, Providence.

The association also:

• Named San Diego's Bureau of Home Appliances winner of 1955 industry award for electrical housewares gift promotion.

• Awarded its first honorary membership to O. C. Small, longtime IAEL corrpesponding secretary, and leader in the electrical league movement.

• Set its next convention for Oct. 3-6, 1956, in Detroit, Mich.

• Announced publication of its electrical league brochure, ". . . But the Sales Must Still be Made on Main Street." Up to 50 copies are free to IAEL members from John Biggi, acting corresponding secretary, 155 E. 44th St., New York 17, N. Y.

Price Set for PUD Sale to WWP; Vote to Decide

Stevens County (Wash.) PUD has accepted an offer of $2.9 million for its properties from the Washington Water Power Company, subject to approval of the county's voters. WWP deposited a check for $145,250—5% of its bid—to secure the offer, and PUD commissioners asked a special election on Nov. 22.

Under the agreement completed Aug. 18 (EW Aug. 29, p 6) between WWP and the utility district, if 60% of the county's voters favor WWP the company will buy out the PUD at the bid price.

If 60% of the voters favor the PUD, Washington Water Power will sell its properties in the county to the PUD at a stipulated price of $3.1 million.

Joe Garvey, PUD president, accepted the bid for the PUD commissioners, and announced that the utility district "in no way favors sale of the PUD," but believes the vote a fair way to settle a long dispute over electrical service provision in Stevens County.

The vote will be the first time in Washington State that the issue of public or private power service has been put before voters who have had both brands. Should the PUD lose out, Garvey explained, it would be continued as a supervisory agency to "see that WWP maintained adequate service at reasonable rates."

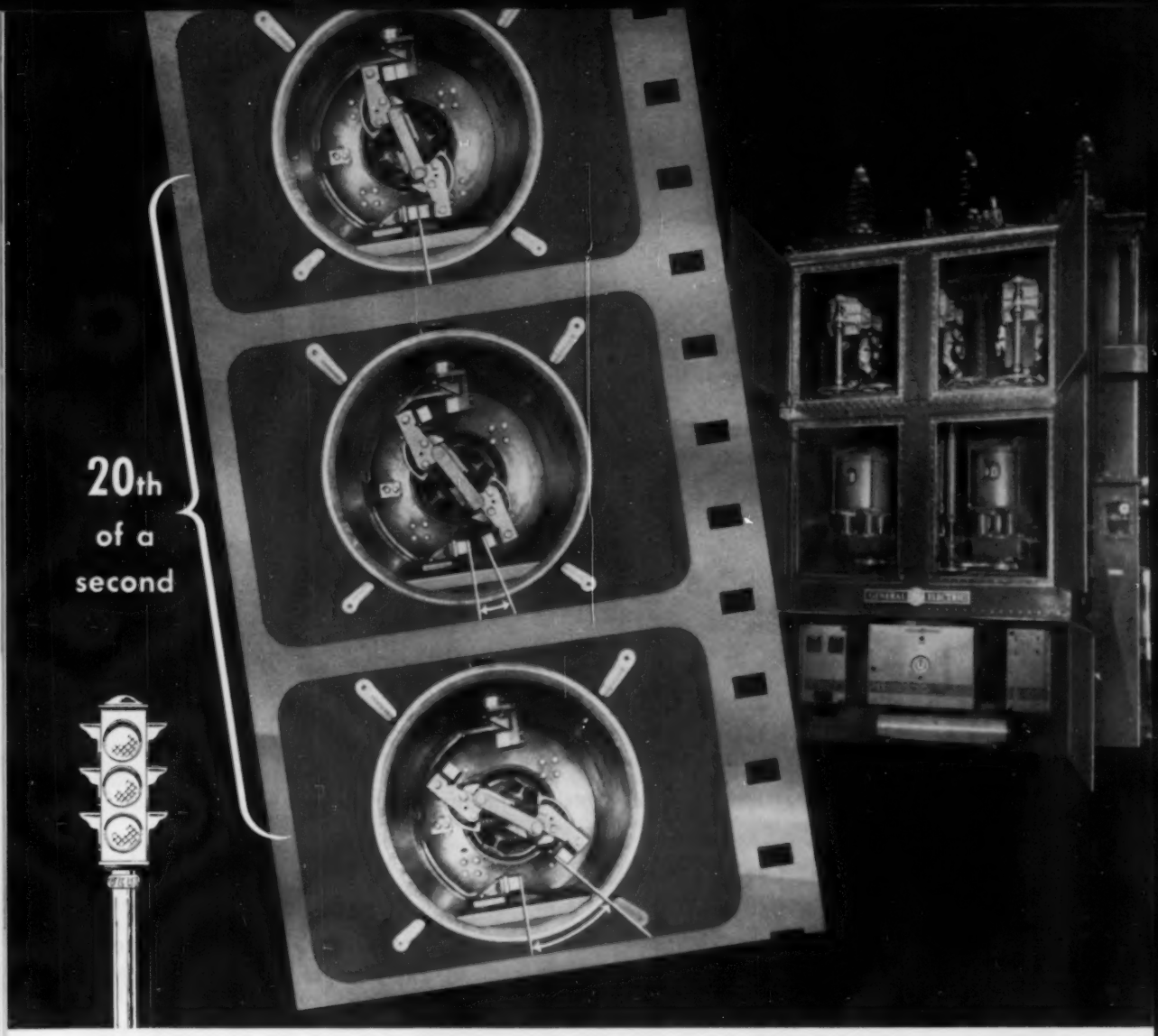
Booklet on Tree Planting Published by L. I. Lighting

A full-color brochure on tree care and planting was published recently by Long Island Lighting Co.

Titled "Selective Tree Planting," the booklet offers an illustrated study of care, selection, and planting of trees for communities and homeowners. A guide-list of trees is included to assist landscape enthusiasts and community planners.

The brochure was written with cooperation of Long Island Nurserymen's Association and Clarence E. Lewis, horticulturist at Long Island Agricultural & Technical Institute.

For copies of "Selective Tree Planting," write Long Island Lighting Co, Mineola, L. I., N. Y.



TRAFFIC COP FOR 400,000 KVA

Contactors, the "traffic cops" in load-tap-changing equipment, are now available for typical regulating transformers rated as high as 400,000 kva. That's a whopping increase over the previous limit of about 150,000 kva.

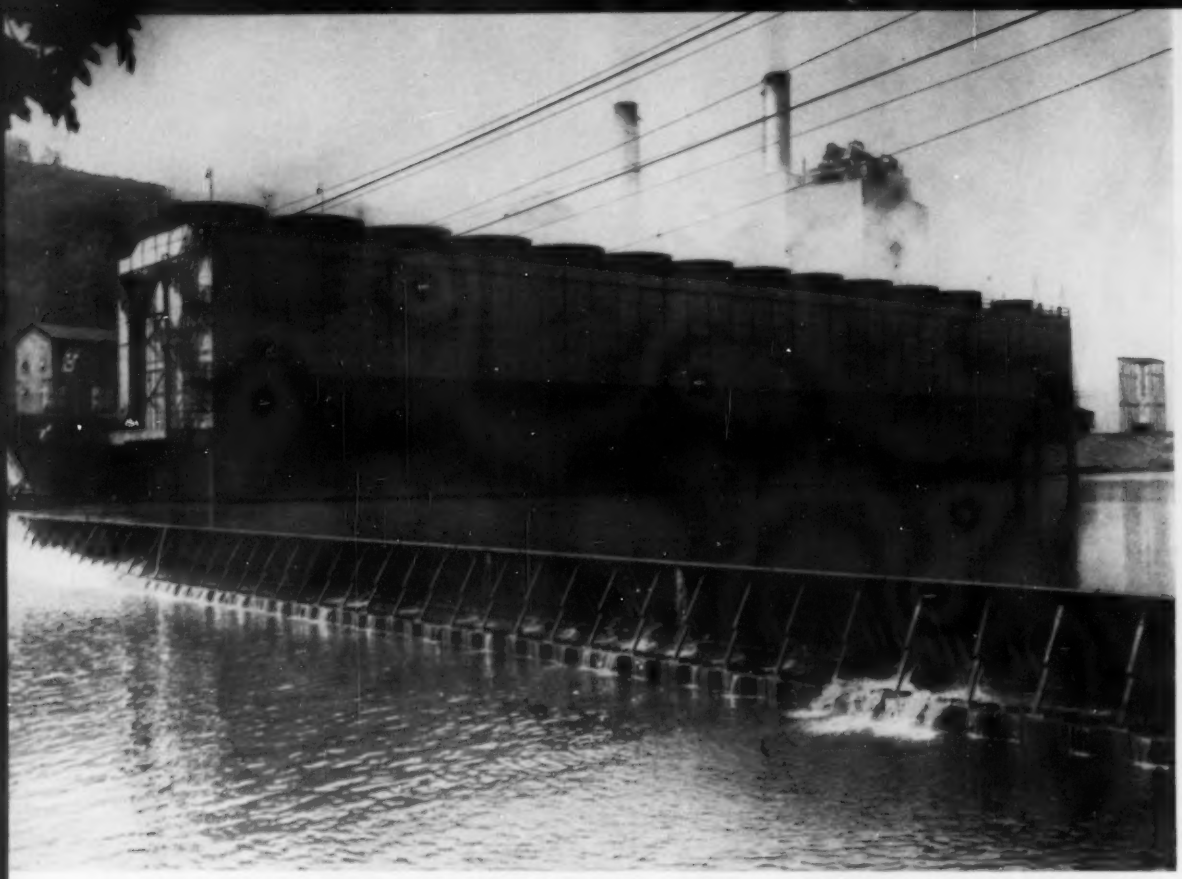
It's all due to G.E.'s new oil-blast contactor—six years in development—thoroughly tested. Even under the maximum short circuit which might be imposed at the transformer terminals, this "traffic cop" will successfully divert current from the tap selector, permitting a tap change to be completed.

Already in use on the new 194,775-kva, 138-kv regulating and phase-changing transformer recently installed by Commonwealth Edison Company, these new contactors represent a major advance in power transformer design. General Electric Co., Schenectady 5, New York. 421-56

Power Transformer NEWS

Progress Is Our Most Important Product

GENERAL ELECTRIC



DAM AND COOLING TOWER TOGETHER SUPPLY SHAWVILLE STATION WITH CONDENSER AND BOILER WATER NEEDS

Dam Adjusts Erratic River Level

GENERATION
Design

Steel flash panels maintain pond for Shawville condensing and cooling water but give way singly to prevent flood conditions

C. W. STATLER, Superintendent, Shawville Station, Pennsylvania Electric Co, Shawville, Pa.

A variable-crest dam and an induced-draft cooling tower have solved water-supply problems caused by extreme variation in river flow at Pennsylvania Electric Co's Shawville Station near Clearfield, Pa. (EW, April 12, 1954, p 25). The 276-Mw station is deep in the central Pennsylvania mountains on the West Branch of the Susquehanna River, which varies in flow between 25,000 and 13,500,000 gpm. The steep surrounding terrain's run-offs can suddenly swell the West Branch which is also subject to periodic lows.

Seeking to adapt the erratic river to the station's condensing and boiler water needs, Shawville planners ruled out a conventional low dam because it would not maintain an adequate pond size. They also eliminated a high dam which by impeding the river's high flow could increase the hazard of upstream floods.

What they decided to build was a low dam with a variable crest. Such a construction maintains an adequate pond during stream lows but automatically releases some of the flow during a sudden, sharp rise in water level. The low dam extends 5 ft above and 6 ft below the original river bed. Made of concrete between sheet steel piling, the main section of the dam is 270 ft long and 18 ft wide.

Across the top of the dam were built bottom-hinged steel flash panels 5 ft wide and 7½ ft high. When raised in position at a 60-deg angle, the panels permit increasing the pond depth as much as 6 ft. Wooden struts holding each board upright are in two parts joined by a ⅞-in. iron bolt which sheers when the overflow reaches 18 in. above the board top. The 4-by-4-in. struts fit pockets in the flashboards and seat in pockets in the concrete dam.

When the river's rise is of sufficient proportions, the flashboards give way individually as the breaking point of each supporting strut is reached and allow an increasing amount of water to escape downstream. The flashboards are undamaged and are raised again with a new strut when necessary.

These boards can be let down and raised at will by means of a cableway

with an aerial car from which men hook a lowering-and-lifting block onto the individual panels and place or remove the struts. Thus the level of the pond can be held at any predetermined height within the range of the boards simply by manipulating the requisite number of panels and using appropriate lengths of struts.

N. England Companies Aided

The design of the hinged flashboards follows a pattern originally developed for the hydroelectric dams of Central Maine Power Co and Public Service Co of New Hampshire. These companies supplied Penelec with the construction and operation details of their installations.

This type of dam permits holding a higher pond level in winter when a low pond might cause ice to form over the condenser intake tunnel. It also facilitates drawing off broken ice or debris from the pond at any point. Furthermore it simplifies releasing hot water from the pond.

One Man Controls 2 Cables

The aerial car operates on one of two cables suspended above the dam. The other cable carries a hook which station personnel maneuver into place for installing or removing struts. The cables, 370 ft long, are connected to guyed A-frame towers on each bank, and have a 5-ton capacity. One man operates both cableways from an enclosed control room on the station side. A 40-hp electric motor moves both the hook and aerial car horizontally or vertically, simultaneously or singly.

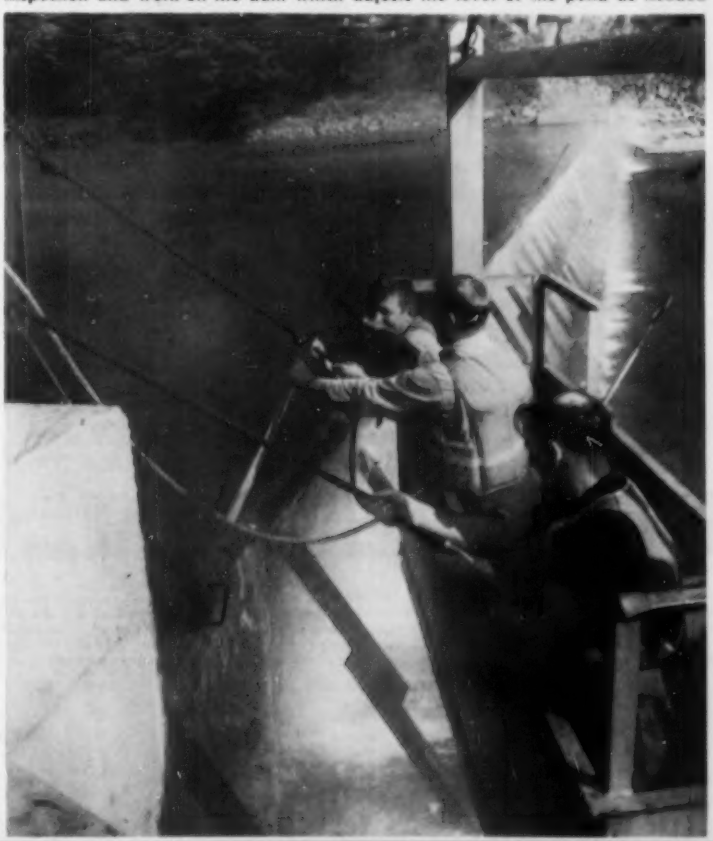
Cooling Rate 52,500 Gpm

Before the dam was built, a scale model was tested at Fritz Laboratory, Lehigh University, to determine the operation of the dam and the effects of erosion on the river bed below the dam. These tests indicated the need for the concrete apron at the base of the dam to prevent erosion of the footing by water fall and turbulence.

Shawville has a large cooling tower adjacent to the dam as part of its system for supplying adequate condenser water. Constructed of California redwood and asbestos cement board, the cooling tower is 312 ft long, 55 ft wide, and 45 ft high. It is equipped with twelve 60-hp fans. The tower can reduce the temperature of water from 115 to 85F. at the rate of 52,500 gpm.

HOOK, operated from the control tower on station side of river, permits adjustment of 4-by-6-ft panels that comprise the flashboards on top of concrete dam

AERIAL CAR, running on overhead cable and controlled from the bank, permits inspection and work on the dam which adjusts the level of the pond as needed



VARNISHED CAMBRIC CABLE

In single conductor sizes from #14 A.W.G. to 2,000,000 C.M. In multiple conductor sizes from #14 A.W.G. to 750,000 C.M. For use up to 17,000 volts between conductors for non-shielded multiple conductor cables; for single conductor and shielded cables operating on an ungrounded neutral system not over 21,000 volts between phases, and for single conductor and shielded cables operating on a grounded neutral system not over 28,000 volts between phases.

Insulated with varnished cambric tape, in accordance with I.P.C.E.A. and Underwriters' specifications unless otherwise specified by you.

Manufactured with solid conductors or stranded in a variety of strandings, coated or uncoated, according to your needs. Available in single or multiple conductor.

For outside covering, you have a choice of braid, for service in dry locations; lead, for service in damp locations; and for aerial use or direct burial we recommend a protective armor such as steel tape or galvanized round wire armor.

AS LEADS FOR MOTOR AND OIL SWITCHES, GENERATORS, TRANSFORMERS,

YOU WANT

- TOP RESISTANCE TO HIGH OPERATING TEMPERATURES, OIL AND GREASE;
- DEPENDABILITY THAT SAVES REAL TIME AND MONEY—

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JOHN A. ROEBLING'S SONS CORPORATION, TRENTON 2, N. J. BRANCHES: ATLANTA, 924 AVON AVE. • BOSTON, 11-15 STILLING ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 2353 FREDONIA AVE. • CLEVELAND, 13235 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5240 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1930 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • PITTSBURGH, 1723 HENRY W. OLIVER BLDG. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, 19 RECTOR ST., NEW YORK 6, N. Y.

Brownell Rules on Clark Hill Proposal

- **Opinion on proposed contract based on Federal Flood Control Act of 1944**
- **Emphasis placed on intent of Congress when preference provisions passed**

At the request of the Department of the Interior, Attorney General Herbert Brownell, Jr, on July 15 submitted his opinion of a contract then proposed between Interior and Georgia Power Co. By the proposed terms, the utility would have purchased power generated at Clark Hill Dam from Interior. In turn, the company would have resold the power, in quantity and rates guaranteed by the government, to Georgia rural electrical cooperatives.

Attorney General Brownell's opinion, in part, reads:

"Section 5 of the Flood Control Act of 1954 reads as follows:

"'. . . Preference in the sale of such power and energy (from federal projects) shall be given to public bodies and cooperatives. The Secretary of the Interior is authorized, from funds to be appropriated by the Congress, to construct or acquire, by purchase or other agreement, only such transmission lines and related facilities as may be necessary in order to make the power and energy generated at said projects available in wholesale quantities for sale on fair and reasonable terms and conditions to facilities owned by the Federal Government, public bodies, cooperatives, and privately owned companies. . .'

Congress' Intent Emphasized

". . .The problem which confronts me is to ascertain the meaning which the Congress intended to give to the provision of Section 5 of the Flood Control Act that 'preference in the sale of . . . power and energy shall be given to public bodies and cooperatives'. . . .

"As one of my predecessors has aptly observed: 'In construing any statute the legislative intent, if it can be ascertained, must control . . .'

". . . it is my opinion that Section 5 means that when the Secretary of the Interior has before him two competing offers to purchase power, one by a preference customer and the other by a non-preference customer, and the former does not have at the time the physical means to take and distribute the power, he must contract with the preference customer on condition that such customer will, within a reasonable time to be fixed by the Secretary, obtain the means for taking and delivering the power.

Interior's Duty Appraised

"If within the period fixed the preference customer does not do so, the Secretary is then free to contract with the non-preference customer. Such a contract, however, would have to contain, in the situation here involved, adequate provision enabling the Secretary to deal with the preference claimant should it subsequently obtain the means to take and deliver the power.

"It is not necessary for me at this time to delineate the terms of such a provision. Nor, in the circumstances here present, does the Secretary, in my judgement, discharge his statutory duty of giving a preference in 'the sale' of power to public bodies and cooperatives by disposition to a private company under an arrangement whereby the latter obligates itself to sell an equivalent amount of power to preference customers to be designated by the Secretary. . . . This is what the proposed contract amounts to. . . .

"I have made . . . extended reference to the legislative history because it convinces me of the deep concern that Congress had, in making provision for the disposition of federal power, for the preferential status of public bodies and cooperatives. . . .

Congressional Check Pointed Out

"It is true that, as enacted, the section does not confer upon the Secretary of the Interior an untrammelled authority to build or acquire transmission lines at the cost of the government in order to make the power available to these organizations; he can do so only from funds to be appropriated by the Congress—and in this case no such funds have been appropriated.

"Yet . . . this restriction . . . cannot be taken as evidence of an intention to circumscribe the preference provision to . . . render it inoperative. . . . It seems to me that this would result from an interpretation . . . authorizing the Secretary of the Interior to reject a purchase offer by a cooperative because it has no presently available means for taking and distributing the power.

"I am certain, in the light of all that was said in the debates on the subject of preference for public bodies and cooperatives, that such an interpretation flouts the Congressional purposes. . . .

Past Policy Considered

"My views would appear to be consistent with those expressed by your department in its Power Policy Statement of August 1953 . . . stated in the following terms:

" 'The Department of the Interior will operate the federally owned generating and transmission facilities under its control for the benefit of the general public, and particularly of domestic and rural customers, and the Department will give preference and priority to public bodies and cooperatives in disposing of electric energy generated at federal plants . . . It will be the policy of the Department to dispose of power remaining . . . to privately owned public utilities serving domestic and rural customers in the area.'

Proposed Contract Ruled Out

"It is also pertinent to note the testimony of Assistant Secretary Aandahl that '. . . we recognize the rights of preference customers and that we are leaning over backwards to do that'. . . .

"For the reasons stated above, it is my opinion that Section 5 of the Flood Control Act of 1944 does not authorize the Secretary of the Interior, under the circumstances here presented, to enter into the proposed contract with the Georgia Power Company. . . ."

GENERAL ELECTRIC

General Electric silicone-rubber cable's resistance to heat, moisture, and oxidation (as described on the opposite page) makes this cable ideal for operating conditions typified by this electric arc furnace in a steel mill.

IMPORTANT FACTS ABOUT NEW G-E SILICONE-RUBBER CABLES

New insulation permits high temperature operation for power and control circuits, equipment and generator leads

G-E silicone-rubber insulated cables, with higher ratings than ordinary rubber types, are now available for general plant wiring including power and control circuits, and equipment leads. These cables withstand higher operating and ambient temperatures—permit copper temperatures as high as 125 C for continuous operation. They maintain their electrical and physical properties, even through prolonged water immersion tests. Because silicone-rubber is moisture-resistant, no lead sheath is required.

These advantages, plus excellent ozone resistance, are the reasons why silicone-rubber cables will maintain circuit integrity where other cables often fail.

The high temperature rating will often permit you to run greater loads through existing conduit or duct installations — and installation is a simple matter. G-E silicone-rubber cable is as flexible as rubber-insulated cable and can be handled just as easily. No special tools, fittings, or terminations are needed. The tough asbestos braid permits easy pulling through conduit. The cable can also be supplied with flexible armor for open installation.

Write for the new free booklet for complete details. Section W156-1127, Construction Materials Division, General Electric Company, Bridgeport 2, Connecticut.

Progress Is Our Most Important Product

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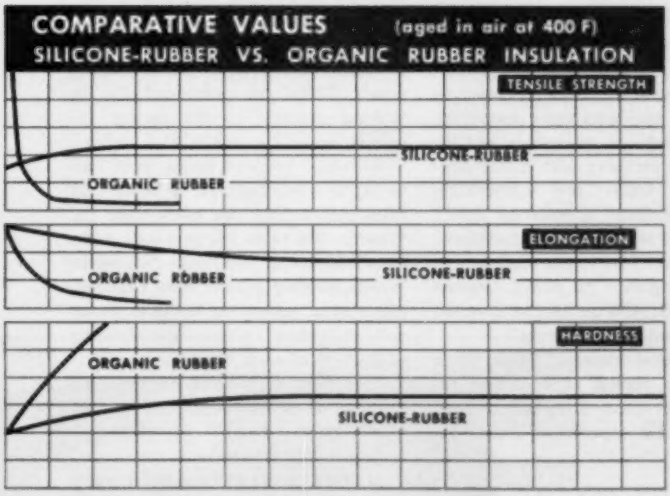


BACTERICIDAL ultraviolet lamp adds 175 kwhr a year to residential load

THROUGH CONTINUOUS OPERATION, 12-w odor-destroying ozone lamp can add 105 kwhr a year to load, says Hamilton. Soft glow makes good night light

Ultraviolet Lamp Can Build Load

SALES
Residential

10-in. cold cathode unit, operated continuously, uses 175 kwhr a year, says expert. This is nearly 7% over average home load

Utilities seeking an increase in residential load free from seasonal and cyclical fluctuations would do well to investigate the bactericidal ultraviolet lamp, says one manufacturer.

"This germ-killing lamp and its smaller cousin, the odor-destroying ozone lamp," J. P. Hamilton of Westinghouse Electric Corp's Lamp Division told Electrical World, "represent a constant 24-hr residential load. A typical 10-in cold cathode lamp consumes 20 w, including ballast losses. Operated continuously, it registers some 175 kwhr a year."

Related to an average annual residential power consumption of 2,606 kwhr, as reported by the Edison Electric Institute for the year ended March 31, 1955, this lamp load would contribute a yearly load increase of nearly 7%, contends Hamilton. Though of small wattage rating, individual ultraviolet lamps can account for a greater annual kwhr consumption than each of some 80% of the appliances now in common use, he said. Furthermore, continuous operation of the lamps obviously minimizes the difference between the peak and minimum loads.

To help prove his point, the lamp expert offers this example: If a hypothetical utility with, say, 844,000 residential customers, were to supply 1,734 million kwhr at an average annual consumption of 2,060 kwhr, the sale of one 12-w odor-destroying lamp and ballast to only 1% of its customers would increase annual power sales by 885,000 kwhr. This individual residential increase of 105 kwhr would mean a 5.1% average increase.

According to Hamilton, one utility, in a four-week campaign promoting the sale of two-lamp odor-destroying fixtures, combined newspaper and direct mail advertising with direct contacts. The utility and cooperating retailers marketed a total of 2,073 units. This represents an additional load of 270,000 kwhr per year.

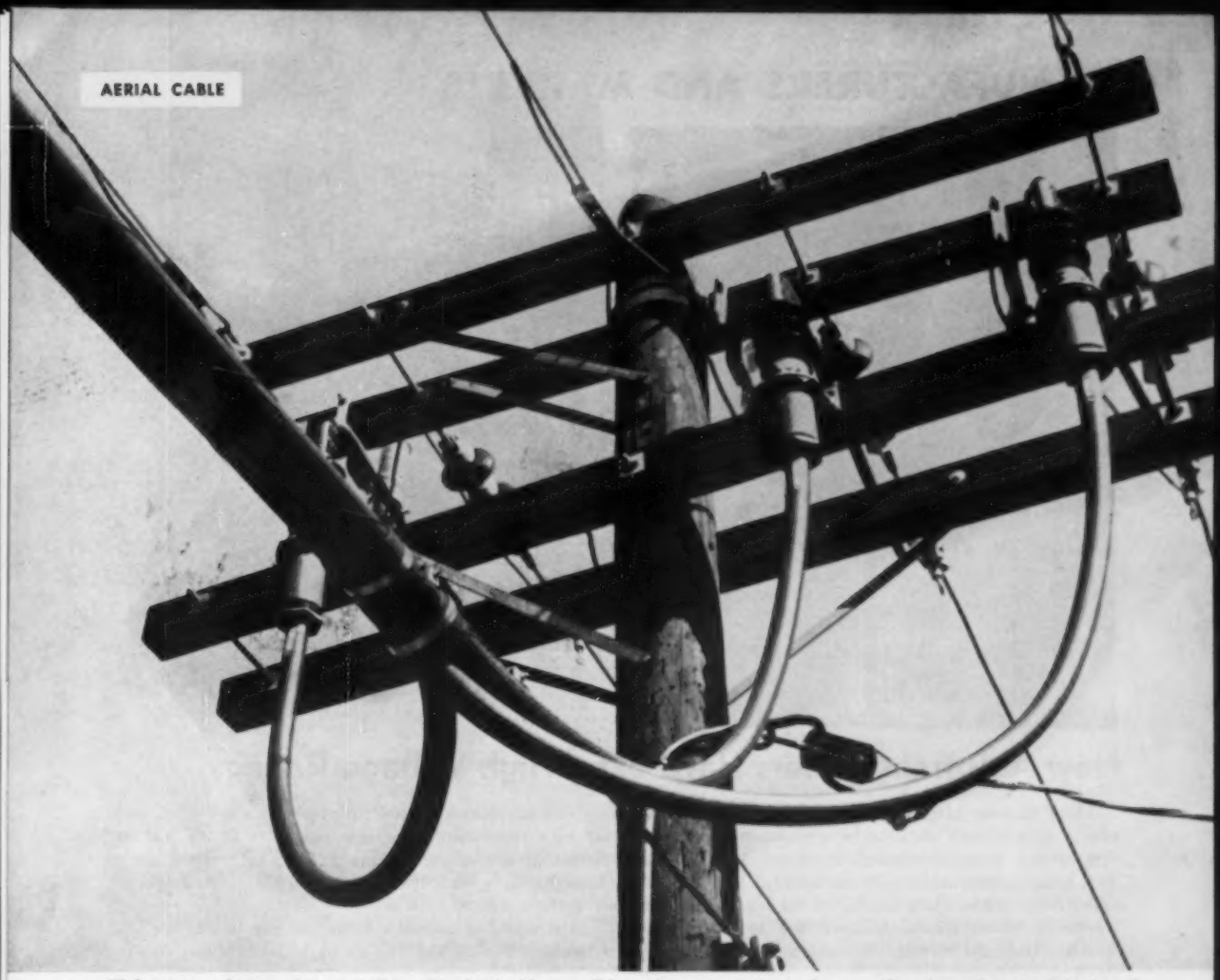
"This program," he added, "netted a profit of $1,420 on $9,850 invested for lamps and sales expenses.

"The almost nominal sales effort and modest capital expenditures required for inventory," Hamilton said, "are favorable aspects of increasing load growth through promotion of ultraviolet lamps. To add by other means the 175-kwhr load represented by a single 20-w germicidal lamp fixture, it would be necessary for the customer to possess such load-building appliances as an automatic washer, a fruit juicer, a waffle iron, a food blender, a sewing machine, a floor polisher, a vacuum cleaner, and a toaster, having a retail value of nearly $700.

"The added disadvantage of inventory costs, plus the increased difficulty of selling eight different items totaling nearly $700," he continued, "is in striking contrast to the factors involved in selling a $29 U-V lamp."

Although sales of single units can be highly advantageous, he noted that mass installations are even more so. What is said to be the first such mass installation, the 300-home Northfield Woods housing project near Chicago, offers 10-in. germicidal lamps as standard equipment within the heating equipment of each home.

These 300 units alone are expected to mean an additional annual load of 52,500 kwhr.



High-ozone resistance of Anaconda Type AB-insulated cable pays off here where ozone-cutting is often a problem when ordinary insulation is used.

New aerial cable gives ozone the air

New Anaconda Type AB-insulated cable has *highest* resistance to ozone.

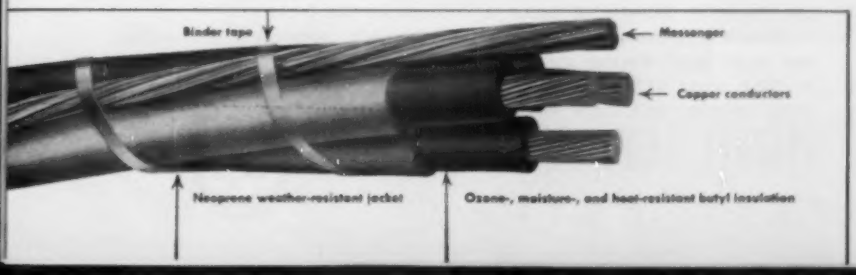
Ozone-cutting – No. 1 enemy of high-voltage insulation – can be arrested.

ANACONDA Type AB butyl insulation on aerial and other high-voltage cable ends this problem.

Type AB is *inherently* resistant to ozone. Moreover, this high resistance to ozone has enabled Anaconda engineers to concentrate on other properties – to develop Type AB's other electrical and physical properties to the very peak of performance.

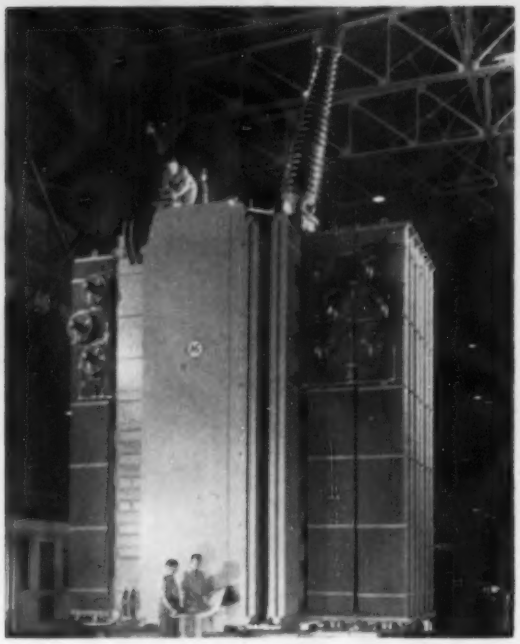
Proof is in a series of tests – made over a period of years by Anaconda engineers. These tests – covering ozone, temperature, moisture absorption, dielectric strength, ionization level, aging, and other properties – show clearly the superiority of ANACONDA Type AB butyl insulation.

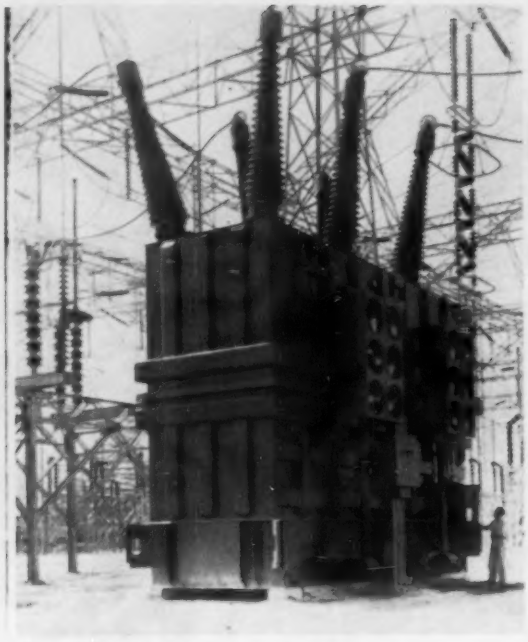
Put your cable problems up to the Man from Anaconda. Anaconda Wire & Cable Co., 25 Broadway, New York 4, N. Y.



ANACONDA®

AERIAL CABLE





New Autotransformers Have Extra-High Voltage Ratings

Allis-Chalmers Mfg Co has completed the successful testing of a 345-kv autotransformer, reported to be the first of this rating manufactured in the United States. This unit, the first of six, will be installed in one of two 600,000-kva banks which will be located at each end of the Bonneville Power Administration's new 345-kv transmission line from the McNary Substation, Umatilla, Ore., to the Ross Substation, Ampere, Wash.

Each of these single-phase transformers is rated 120,000/160,000/200,000 kva, class OA/FA/FA, high voltage 345 kv, low voltage 230 kv. This unit weighs 394,000 lb and has a total height of 36.5 ft.

In addition to the steep wave and standard ASA impulse tests, the autotransformer was subjected to the new switching surge tests recently introduced by A-C (EW, Aug. 15, 1955, p. 56).

This imposing piece of equipment is a 400-Mva autotransformer recently put into operation at the Tanners Creek Station of the Indiana & Michigan Electric Co at Lawrenceburg, Ind. It was built for I&M by Westinghouse Electric Corp.

The transformer has a rating of 341 to 327 kv with taps for 318, 309 and 300 kv. A 13.8-kv tertiary winding is provided for third harmonics and neutral stabilization. It is forced-cooled with power for pumps and fans supplied by integrally-mounted transformers connected to the 13.8 kv winding. Total weight of the unit is 574,000 lb. It is about 33 ft high from base to bushing tips, 30 ft long and 16 ft high.

Westinghouse reports that although close-ratio autotransformers have been used for many years, this is the first such application on a 330-kv system.

Canadian Equipment Production Levels Off at Billion Mark

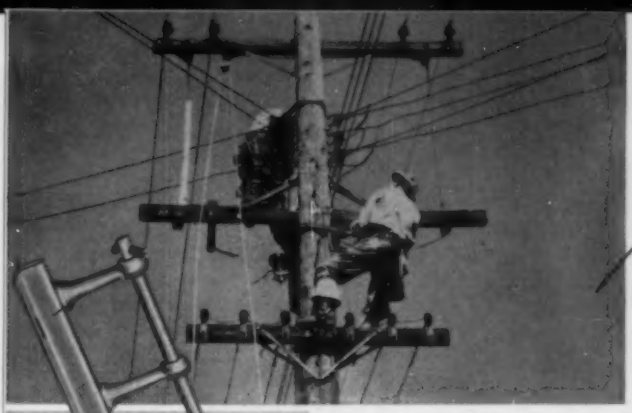
Domestic production by companies in Canada's electrical manufacturing industry is estimated at $986,791,000 for 1954, an increase of only 1.3% over 1953. This production value was revealed by Kenneth V. Farmer, president of the Canadian Electrical Manufacturers Association, at its 11th annual meeting recently at Niagara Falls, Ontario.

"While this figure is healthy in itself," Farmer said, "it nevertheless shows conclusively that the industry's production has levelled off to a serious extent. Production increase in 1953 over 1952 was 16.6%."

According to latest available industry statistics, electrical manufacturing is considered to be Canada's largest manufacturing industry in terms of number of employees and of salaries and wages paid. Farmer stated that in 1954, some 457 electrical manufacturing plants in Canada employed 75,075 workers and paid $258,510,000 in salaries and wages. Materials worth about $396,583,000 were purchased by the industry for use in manufacturing processes. The electrical manufacturing industry spent an additional $7,424,000 for fuel and electricity last year.

Canada's electrical manufacturers will probably be faced with lower operating profits according to present

(*Continued on page* 59)



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Cut hardware replacement costs to the bone with USS COR-TEN Steel

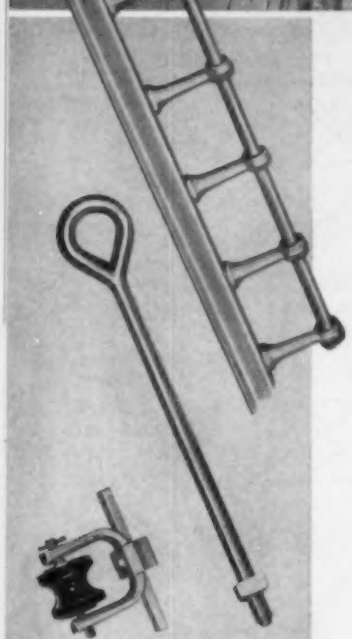
Get galvanized USS COR-TEN Steel hardware to match the service life of creosoted poles in industrial, marine and rural atmospheres

USS COR-TEN Steel hardware is the answer to a costly maintenance problem that has bedeviled utilities for years.

Why? Because USS COR-TEN Steel has 4 to 6 times the resistance of plain carbon steel to atmospheric corrosion—the arch enemy of pole line hardware.

Thus, when the galvanized coating is gone and the base metal is exposed to the elements, the high atmospheric corrosion resistance of COR-TEN Steel takes over. For as soon as the zinc coating disappears, COR-TEN Steel develops its own special defense against further corrosive attack. It forms a dense, tightly-adhering and highly resistant oxide coating that prolongs life for many years beyond the time at which ordinary galvanized steel hardware rusts out and needs replacement.

In addition, COR-TEN Steel gives still another service-life dividend on strength alone. That's because COR-TEN Steel has a 50% higher yield point than carbon steel, which means that COR-TEN hardware can wear much thinner than carbon steel hardware before requiring replacement.



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Turnpike for Kilowatts

Since fifteen billion kilowatt-hours per year makes heavy transmission traffic, energy suppliers are now building to deliver power blocks of this order on extra-high voltage transmission lines—turnpikes for the electric utilities industry. Just as constant traffic flow must be maintained on automotive superhighways, so must continuity—or reliability—be an outstanding characteristic of EHV transmission lines. You can be certain that line builders select materials of proved dependability for such circuits. Two-thirds of the EHV circuit-miles—built or building—in North America are insulated with standard O-B suspension insulators!

Widespread use of standard O-B insulators in rigorous EHV applications gives good proof of the reputation they have earned among buyers and users of insulators. The same O-B insulators are appropriate for every transmission application. Buy and use them confidently, knowing that O-B insulators have been judged equal to the most exacting transmission jobs.

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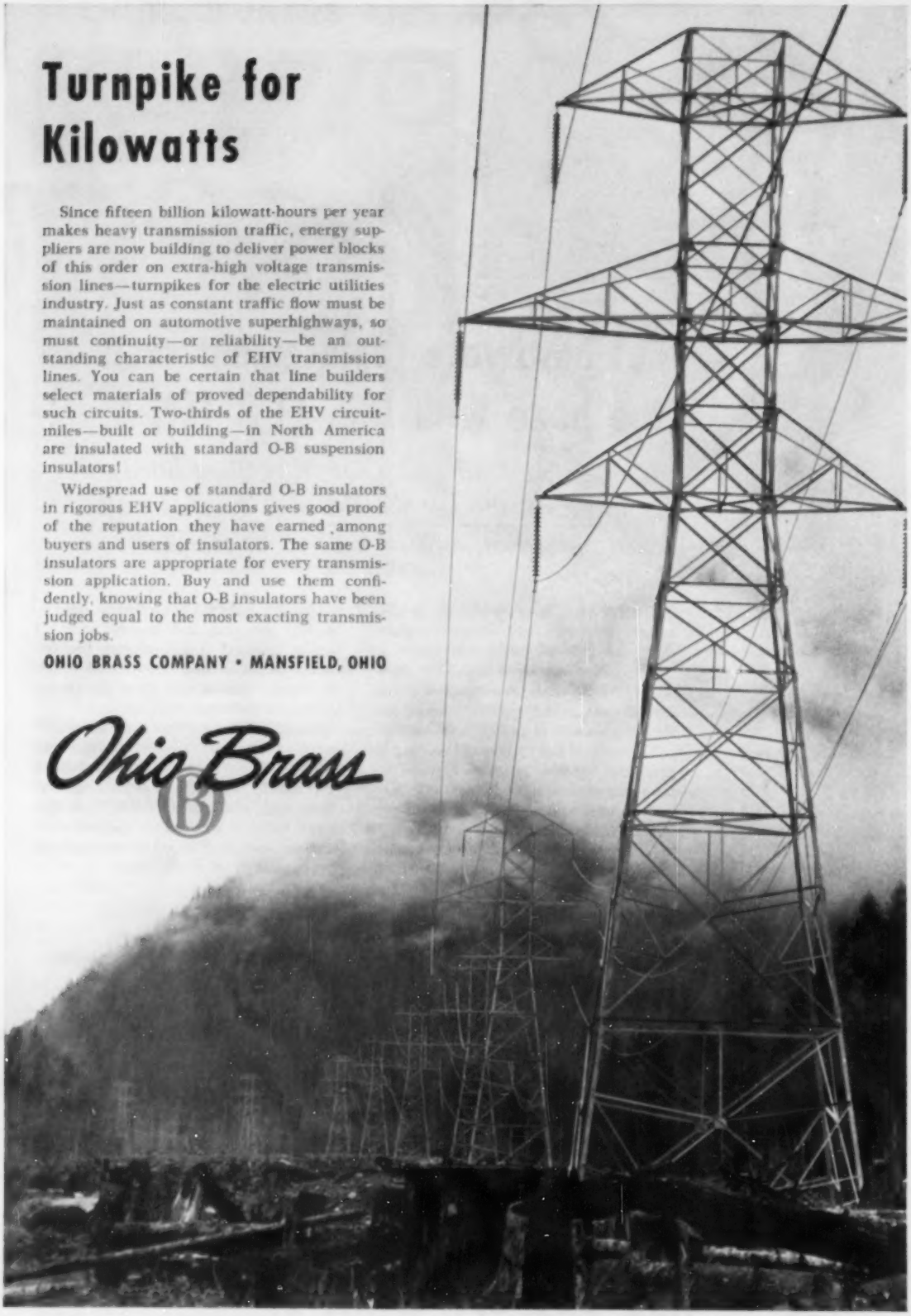
Ohio Brass



L-M Designs New Switch

Two Line Material Co engineers are shown studying a prototype of L-M's new vertical-break, group-operated disconnect switch. The switch, designated Type PV and designed for sectionalizing, disconnecting or bypassing applications, is rated at 115 kv, 600 amp.

Incorporated in the new switch are all of the field-proven features of L-M's lower voltage PV switches, says T. A. Fjellstedt, chief engineer, power switching equipment. The lower voltage PV line consists of switches rated 400, 600 and 1,200 amp, from 7.5 through 69 kv.

G. W. Cooper, product manager, protective and power switching equipment, said that the new switch will be in production early in 1956.

Canadian Production

(*Continued from page* 56)

indications. This is a result from attempts by Canadian manufacturers to meet the low import prices of foreign manufacturers.

The electrical manufacturing group realized an average profit on their sales dollar of only 2.6% during 1954, as against 4.0% for 1953 and 4.1% for 1952, said B. Napier Simpson, general manager of CEMA. Compared with the annual survey of the Canadian Manufacturers Association, he stated, "it is exactly one-half of the average profit of 5.2% shown by all industry in Canada for last year."

Canadian industry must pay less attention to the tariff and look to business if it is going to overcome the import problem, warned H. M. Turner, vice president of CEMA, and chairman of the board of Canadian General Electric Co, Ltd.

Turner stated, "We have passed the point where our industries can hope for an easing up on the large volume of imports which flood our markets each year. It would appear that the only effective approach is to get the economics of our industry in balance, to go out and compete for the job, and then take care of the production technicalities afterwards." He said that Canada's electrical manufacturing industry is currently faced with imports totalling around 25% of the Canadian market.

On the subject of nuclear power, Turner said that by 1965, Canada will be producing nuclear power commercially at a cost close to that of (conventional) thermal electric power. He stated that Canada's first nuclear power plant, which will be located on the Ottawa River, should be in operation within three or four years.

While considered as a demonstration unit, this nevertheless will be a 20,000 kw commercial plant which will be integrated into Ontario Hydro's power system.

U. S. Aluminum Production

Primary production of aluminum in U. S., according to the Aluminum Association, New York City, was 133,551 tons in August, up from 132,669 tons in July and 125,296 in August 1954. Total production was 1,026,086 tons for the first eight months this year, an increase of 59,229 tons over the quantity for the same period last year.

Chase Brass Operating

Chase Brass & Copper Co, Waterbury, Conn., advised that less than seven weeks after the Aug. 19 flood partial operations have been resumed. On Oct. 5 the first metal was cast in the electric furnaces at the Metal Works plant. Starting October 10 the entire Wire Mill was operating approximately 100%. The rains October 15-16 had only a minor effect on over-all operations.

M&M BRIEFS

Admiral Corp, Chicago, Ill., will produce its 5 millionth television receiver at the end of October, announced W. C. Johnson, vice president-sales. For these receivers Johnson estimates that the company consumed over 10 million miles of wire (2 miles of all types of wire for each receiver) and over 100 million picture and receiving tubes.

Hercules Powder Co, Wilmington, Del., will construct a $10 million plant at Parlin, N. J., for the production of new-type high molecular weight polyethylene, named "Hyfax."

Westinghouse Electric Corp recently dedicated its new watthour meter plant at Raleigh, N. C. The plant houses over 500,000 sq ft of manufacturing space and is situated on a 100-acre plot. In addition to a complete line of watthour meters, the plant will make mounting equipment for residential, commercial and industrial use.

General Electric Co will build a new home for its rectifier department at Lynchburg, Va. The department is now located at Lynn, Mass., and Limerick, Me. Construction of the $5 million dollar plant will start in Mar., 1956. Initial production is scheduled for Jan., 1957.

Sierra Electric Corp, manufacturer of wiring devices, plastic products and electronic components, has moved into a new plant at Gardena, Calif.

BUSINESS OUTLOOK

Electrical World
OCTOBER 24, 1955

The outlook, in brief: It looks as though the business boom will continue well into 1956—but at a slower pace than it has been moving so far in 1955. There are clear signs that capital spending for new plants and equipment, consumer purchases and output will continue at the present high level over the next 9 months. Beyond mid-1956 the outlook is less clear.

The boom will continue into 1956 because consumers have the money in their pockets to spend. And tax cuts, probable in any Presidential election year, would bolster consumer spending even more.

True, inventories have been building up recently. They've been increasing about $3.5 billion, at an annual rate, in recent months. But they do not yet seem out of line when compared with the fast pace of retail sales. In fact, the automobile, steel and appliance industries appear in much better shape than most observers thought possible.

The tremendous inventory of 1955 cars—less than one month's supply—will be about cleaned up before the new models roll out in volume. And Detroit is already talking of assembling 6 to 6.5 million cars in the 1956 model year. The most optimistic estimate of production of 1955 models made at this time last year was 5.8 million. Actual 1955 output will come close to 8 million.

The steel industry, too, is producing at about 95% of capacity. And it now looks as though mills will turn out 115 million tons of steel by December 31st. Some steel is going into inventory. But not much. Several major types of steel—sheets for auto bodies and freight cars, and structurals for the building industry—are still hard to get. So steel output should stay high well into 1956.

▶ The electric appliance industry has been able to sell 1955 models of most appliances pretty well. And it's expected a heavy Christmas selling season will put appliance makers in good shape by December 31st.

The rosy outlook for the first-half of 1956 signals that Gross National Product (the measure of total output of all goods and services) will pass the $400 billion mark early next year. GNP is now running better than $390 billion, at an annual rate. A continued slow rise of prices—industrial prices may go up another 2% over the next six months—will push GNP up higher in dollar terms, even if the expected rise in volume of output does not develop.

The picture is less clear when looking at the second-half of 1956. But there are already some guide posts to go by.

Inventory building cannot continue indefinitely. So a leveling off of production is due, probably after mid-year. Second, installment credit has been rising very fast throughout 1955. The rate at which consumers are willing to continue to add to their debt may well slacken later next year. Third, the squeeze on the homebuilding industry by Federal Authorities through tighter credit terms will probably mean fewer houses completed and sold in 1956. This year about 1.3 million are being built.

A slackening in these three areas—inventory building, installment credit and homebuilding—could result in lower industrial output by the second-half of 1956. But it's still too early to predict accurately that far ahead, especially in a wide-open election year.

THE SANGAMO J2

. . . your best investment in watthour meters!

Here are the features which give the Sangamo J2 long, trouble-free service life . . . features which make the J2 the best investment you can make in watthour meters:

ACCURATE MEASUREMENT TO 100 AMPERES without sacrifice of performance at light loads.

LIFETIME BEARING SYSTEM. Proved by millions of Sangamo Meters in service up to twenty years.

HIGH INSULATION LEVEL to withstand high-voltage surges without damage.

HIGH DRIVING POWER . . . not affected by friction caused by foreign matter even down to the lightest loads.

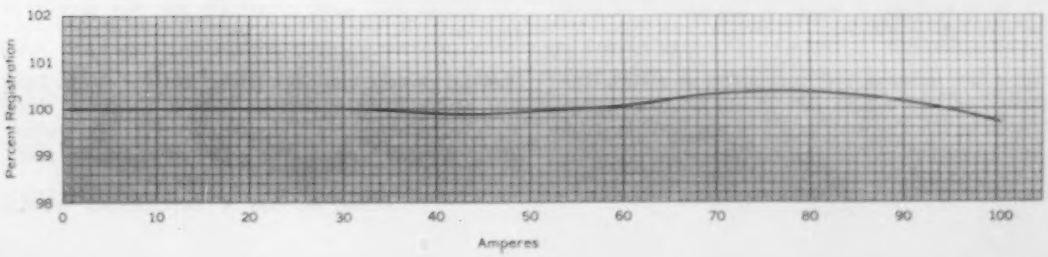
CORROSION-RESISTANT FINISHES AND MATERIALS for optimum performance in humid, salt-laden or corrosive industrial atmospheres.

PLUS SLOW SPEED!

At full nameplate rating, the J2's disk makes only 10 revolutions per minute. *This is many times slower than the disk speed of any other watthour meter on the market today.* And slow speed, which results in less wear on moving parts, is one of the big reasons why the J2 lasts longer . . . gives you more years of trouble-free service.

SANGAMO ELECTRIC CO.

SPRINGFIELD, ILLINOIS



J955-6

IN THE INDUSTRY

Debate Reflects Things That Ain't

Coon-Neuberger controversy in Oregon hits at basic points in federal-local power fight. Coon makes progress in trimming some of claims made by Senator

FRANK J. KOVALCIK, Western Editor, Electrical World

Electric customers and the general public in eastern Oregon have been treated to an element that has been long missing from the political scene. Ten communities have witnessed a debate between Sen Richard L. Neuberger (D-Ore.) and Rep Sam Coon (R-Ore.) on the question, "Agreed, that the John Day project bill (introduced by Coon) is in the public interest."

This bill would allow local public and private interests to put the Eisenhower Administration's partnership policy into action. It would allow them to advance funds toward construction of the power features of the multipurpose John Day project. This is to be built by the Corps of Engineers on the Columbia River between Washington and Oregon. Participating groups would receive 50-year power contracts in return for the funds, in addition to operating and maintaining the power facilities.

Just the Facts, Mr Neuberger

During the first debate at Hood River, Ore., maximum heat was generated during the affirmative rebuttal by Coon. Neuberger had charged that energy from John Day would cost 4.2 mills a kwhr if local interests build it, whereas the Bonneville rate is 2.3 mills. Coon replied that this energy rate was based on an "unrealistic" 6% interest basis and that Neuberger "misled" the audience by not calling attention to a "realistic" 4½% interest rate.

Coon also directly contradicted Neuberger's assertion that resistance by public power Congressmen to the initial John Day bill in 1954 forced local interests to up their advance from $164 million to $273 million. "By delaying the bill a year," said Neuberger, "Senator Morse and I forced them to hike their offer by $109 million. What will they offer in 1956?" Coon pointed out the two bills call for the same funds from non-federal partners. He also added that Neuberger wasn't even in the Senate at this time, a remark which evidently pleased the audience.

The Senator said the Senate got $550,000 planning money for John Day. Coon replied the House supplied $500,000 and the Senate added $50,000.

Neuberger later used Coon's version in his comments.

One questioner from the audience asked if the higher rate for John Day energy might not be attributed to the greater difference between allocations for power facilities at John Day as compared with allocations for the Bonneville project (which is the basis for the present 2.3-mill rate). Neuberger replied the cost allocation for John Day follows the pattern created by the McNary project and that McNary power is being absorbed into the Bonneville system without an increase in rates. He neglected to mention that the allocation for power at Bonneville was about 50%; whereas 88% of the cost of McNary was charged to power.

Neuberger passed off Coon's claim that federal domination in the Pacific Northwest is the real cause of recurring power shortages. According to the Senator, the real reason is the low power rate made possible by federal development that encourages greater consumption. "If you want to eliminate power shortages," said Neuberger, "just double the rates."

John Day Project Is Test Case

Most observers agreed that the debates probably will not cause many changes of heart. Nevertheless, the debates have focused attention on the importance of the John Day Bill as a test case that may set the pattern for private company participation in the Administration's partnership program. In taking his fight for the bill to the people, Congressman Coon has hit the public power forces with the facts in a sincere and down-to-earth fashion. In summing up his rebuttal, he took these words attributed to Will Rogers: "A lot of people talk a lot about a lot of things that ain't."

TECHNICAL NOTES

Corrosion costs American railroads $260 million annually.

Accuracy within inches is sought in locating faults in pipe-type cable.

Maintenance requirements should be accorded progressively more attention in design as the number of power plant operators is reduced.

Electron flow increases with temperature in molten liquid sulphides, unlike the ionic flow of salt solutions. Physicists look to this discovery as a new approach to studies of liquid structure.

Gang-operated air-break switches installed at strategic locations can eliminate installation of short-circuiting jumpers and expedite transmission ice-melting operations.

Magnetic testing has proved useful in detecting voids, sand inclusions, and cracks in waterwheel buckets. It also locates hard spots in surfaces and flux pockets in deep welds.

Modified phenolic iron oxide primer followed by one finish coat of air-drying plasticized coal-tar has been found effective protection for transmission tower legs, particularly if the steel is warm when both applications are made.

Branch Answers Clark Hill Probe

- **White House Meeting on July 15: 'We are in the dark . . . as to its nature'**
- **Clark Hill Proposals: 'We have made one concession after another'**
- **Brownell's Opinion: 'The first I knew . . . was when I read . . . newspapers'**

Harllee Branch, president of Georgia Power Co, has issued several statements commenting on the Chudoff subcommittee's recent investigation of attempts to supply Georgia cooperatives with power from Clark Hill Dam (see page 8). Some of Branch's comments follow:

On White House Meetings

"Chairman Chudoff's insinuations . . . regarding White House conferences on the Clark Hill matter apparently are part of a pattern of deliberate distortion. . . .

"Neither I nor any other representatives of the Georgia Power Company attended the conference at the White House on July 15th, referred to in Attorney General Brownell's letter. This is the first time we knew that any such conference was held. We are completely in the dark as to its nature.

"In the Fall of 1954, the newspapers of our state carried a story from Washington to the effect that officials of the Georgia Electric Membership Corporation had called at the White House to discuss their demands respecting Clark Hill power. It was stated that they not only talked with officials of the White House staff, but also had a visit with the President himself.

"Inasmuch as these reports indicated that the Clark Hill controversy had thus been carried to the White House for consideration, we asked for the privilege of also presenting our side of the issue. We were advised that it would not be possible for the President to see us, but that we would be granted a 30-minute appointment with Gov Sherman Adams. . . .

"Frankly, we felt presentation was . . . inadequate and ineffective. . . .

"Shortly after this interview, we were informed that the government intended to hold up action on our proposal and on the contract draft which had been prepared by their own engineers and lawyers, in order to allow full opportunity for the co-ops to be further consulted and their interests fully protected.

"Throughout this entire controversy, under both Democratic and Republican Administrations, the public power groups have been shown a consideration and a deference granted to no other interested party. It is ridiculous, therefore, that Chairman Chudoff and his colleagues, by their questions and insinuations, should seek now to create the impression that anyone else, including our company, has received preferential treatment such as that accorded the public power groups.

"The above meeting is the only meeting which any representative of our company has had at the White House on the Clark Hill matter."

On Clark Hill History

"As a matter of fact, the Georgia Power Company started trying to work out satisfactory arrangements for the delivery of Clark Hill power, over our facilities, to the rural electric cooperatives and other preference customers long before the project was completed. . . .

"Our company has not only offered to buy the power at Clark Hill and resell it to the co-ops without profit, transmitting it to them over our facilities, but we have also agreed to 'wheel' power to them for . . . the government.

"This was what the rural electric cooperatives insisted upon, and we yielded to the Interior Department on this point in a further effort to end the controversy, notwithstanding this arrangement will convert many of our customers into customers of the government and will cost the taxpayers hundreds of thousands of dollars a year without giving the preference customers any benefit not equally available under our original proposal.

"Recent statements made before the Chudoff subcommittee make us wonder whether the rural electric cooperatives, who fought so vigorously for a 'wheeling' contract, are still determined to keep the conflict alive notwithstanding our concession on this point.

"For several months our company purchased power from the Clark Hill project on an interim basis in order to prevent losses to the government, even though the price of the power at that time was in excess of what we could have generated it for ourselves.

"The truth of the matter is that the only party to this controversy who has made concessions in the interest of settlement is the Georgia Power Company, and any statement to the contrary is a distortion of the facts and can only be intended to hoodwink the public for political purposes.

"The public will recall that, when the Chudoff subcommittee held its hearing in Atlanta several weeks ago, our company unsuccessfully sought an opportunity to testify as to the real facts in the Clark Hill controversy. The committee declined to hear us. . . . Now that the committee has moved back again to Washington the effort is again made to misrepresent the position of our company.

"Chairman Chudoff's reported statement that our company has sought to 'black-jack' its way through the Clark Hill controversy is without basis.

On Brownell's Opinion

"I have been asked for a comment regarding Attorney General Brownell's reported opinion on our Clark Hill proposal.

"I have not seen the opinion and therefore cannot comment upon either its soundness or its effect. The first I knew of such an opinion was when I read about it in the newspapers.

"It seems significant to me, however, that our proposal was not only found to be in complete conformity with the law by our own counsel, but also by attorneys for the Interior Department under both the Democratic and Republican Administrations. The question of its legality was also the subject of debate before House and Senate subcommittees and on the floor of the Senate itself during the period of 1951-53. On all of these occasions, its legality was conceded.

"We are quite surprised, therefore, to find that its legality has been questioned at this late date."

FINANCE AND REGULATION

Nevada Utility Requests 14% Average Rate Hike

Southern Nevada Power Co, Las Vegas, has asked for an electric rate increase for first time in its 49-year history.

The company filed an application with the Nevada Public Service Commission requesting increases which average 14%. The requested residential rates represent an average increase of 17.9%, while commercial rates would go up 15.3%, and industrial 10.5%. Application asks that rates become effective Jan. 2, 1956.

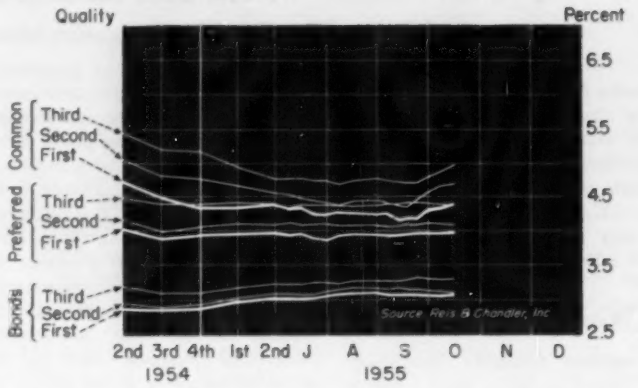
Higher rates are needed, said Pres Reid Gardner, because cost of power has nearly doubled in the past year (mainly due to 38% cut in Boulder Dam power and high cost of alternate power) and because of the utility's $20 million, two-year expansion program. Expansion was necessary because of unprecedented demand for power, Gardner said. "We must raise $10 million next year from sale of company securities to complete the program, and to sell the securities at reasonable terms we must obtain the rate increase," he added.

FINANCIAL BRIEFS

New Financing Expected for Balance of 1955—First Mortgage Bonds . . . Delaware Power & Light Co, $10 million and San Diego Gas & Electric Co, $18 million. **Preferred Stock** . . . Virginia Electric Power Co, 125,000 shares of $100 par stock, and Delaware Power & Light Co, 50,000 shares of $100 par stock. **Common Stock** . . . Southern Co will offer 1,507,303 common shares to its stockholders on a 1-for-12 basis, record Nov. 1 to expire Nov. 22. Commonwealth Edison Co will offer 1,110,375 common shares to its stockholders on 1-for-15 basis, record Nov. 1 to expire Nov. 16. Arizona Public Service Co will offer some additional common stock in November. Rochester Gas & Electric Co will offer 200,000 shares to its stockholders on a 1-for-7 basis.

Tampa Electric Co's stockholders subscribed for 177,552 common shares of 197,532 shares offered on a 1-for-10 basis at $25.50 a share.

Today's Utility Yields (%)



	BONDS			PREFERRED STOCKS			COMMON STOCKS		
QUALITY.....	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd
Oct. 13.....	3.08	3.11	3.30	3.99	4.08	4.38	4.41	4.69	4.95
Oct. 6.....	3.09	3.13	3.31	3.98	4.09	4.38	4.34	4.63	4.86

Utility Earnings

COMPANY	PERIOD MONTHS ENDED		NET INCOME 1955	NET INCOME 1954	EARNINGS PER COMMON SHARE 1955	EARNINGS PER COMMON SHARE 1954
California-Pacific Utilities.....	12	Aug.	$668,065	$621,350	$2.18	$2.11
Dallas Power & Light.....	12	Aug.	7,033,050	5,520,406	.....	.....
El Paso Electric.....	12	Aug.	2,091,346	2,013,011	2.33	2.28
Gulf States Utilities.....	12	Aug.	10,212,604	9,382,091	2.06	1.86
Iowa Electric Light & Power...	12	Aug.	3,611,961	3,038,945	1.94	1.69
Potomac Electric Power.....	12	June	6,865,858	6,449,660	1.14(a)	1.18(a)
Public Service Co of Indiana...	12	Aug.	12,510,578	12,071,320	2.41	2.34
Tampa Electric.....	12	Aug.	3,309,356	2,705,949	1.47	1.26

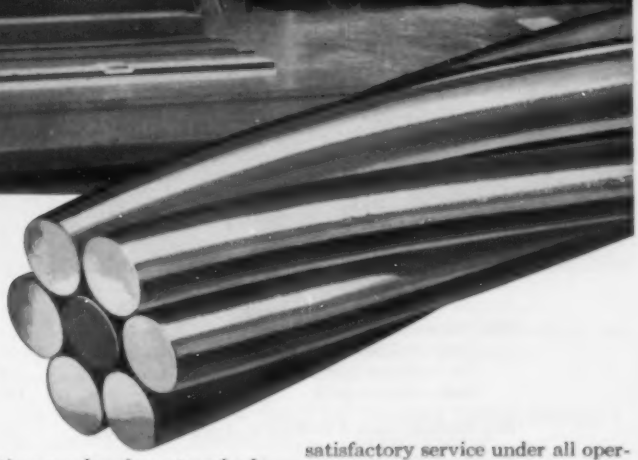
Note—(a) Based on 5,628,700 shares in 1955 and 5,117,040 shares in 1954.

Utility Financing

COMPANY AND DESCRIPTION	AMOUNT OF OFFERING (000)	OFFERING PRICE	YIELD TO PUBLIC
OCTOBER 12-19			
BONDS			
Worcester County Electric—1st mtg 3¼% due 1985...	$8,500	102.384%	3.25%
New York State Electric & Gas—1st mtg 3¼% due 1985	15,000	102.384	3.25
COMMON STOCK			
Louisville Gas & Electric—160,000 sh (being offered commonholders on 1-for-10 basis, record Oct. 13 to expire Nov. 1).....	$7,520	$47.00	4.26%
New York State Electric & Gas—303,407 sh (being offered commonholders on 1-for-10 basis, record Oct. 18 to expire Nov. 3).....	11,226	37.00	5.41
SCHEDULE FOR OCTOBER			BID DATE
BONDS			
Long Island Lighting—1st mtg due 1985.....	$15,000	.....	Oct. 26
PREFERRED STOCK			
Pacific Gas & Electric—1,000,000 sh $25 par.....	$25,000	.....	Oct. 25(a)
COMMON STOCK			
Indianapolis Power & Light—209,686 sh (to be offered commonholders on 1-for-15 basis, record Oct. 27 to expire Nov. 10).....	.....	.....	.....

Note—(a) Blyth & Co, underwriter.

This ASQC Test Safeguards every inch of ALCOA ACSR*



Your Guide to Aluminum Value

ALCOA ALUMINUM ELECTRICAL CONDUCTORS

ALUMINUM COMPANY OF AMERICA

*ASQC—Alcoa Statistical Quality Control—a recognized standard of excellence in the aluminum conductor industry.

Every time we break a strand of ACSR (. . . and we do it many times a day, as part of a continuing production check for quality), we're making certain that a strand doesn't break after you put it in service.

But that's only one of many checks we make. The list of tests is unmatched in the industry. It includes:

Metallurgical Specifications—quantometer tests on each pour of rolling ingot.

Uniformity—systematic checks for dimension and surface quality during fabrication.

Conductivity—to assure peak carrying capacity per pound.

Tensile Strength—to safeguard satisfactory service under all operating hazards.

Elongation—to insure adequate ductility.

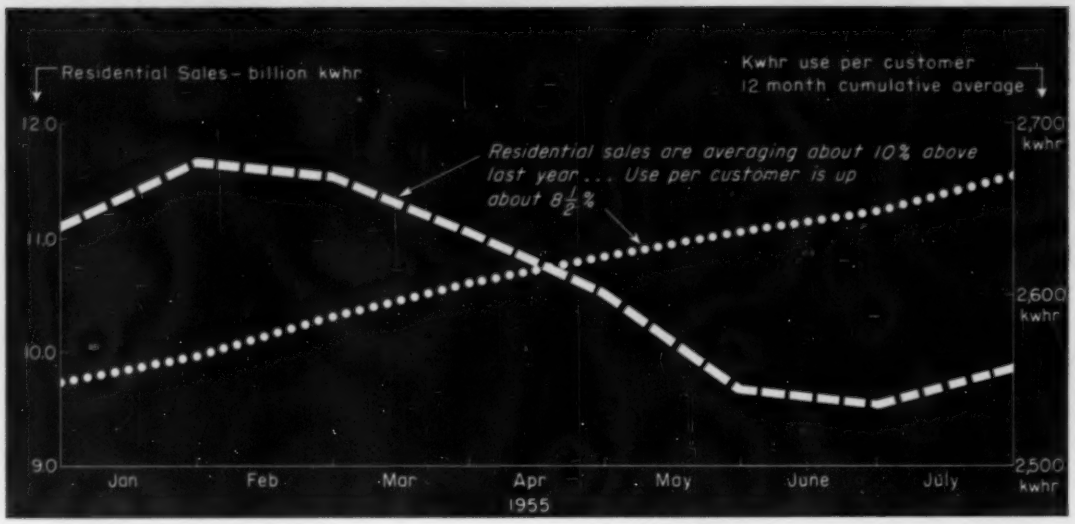
This Alcoa Statistical Quality Control program is unique, an exclusive service. Detailed test records are on file at each plant.

It's a plus value that costs you nothing more. No wonder independent surveys conducted for the past ten years show Alcoa to be top choice of T & D users.

Your local Alcoa electrical conductor salesman stands ready to give you expert engineering assistance in solving your problems. Call him—or write direct to Aluminum Company of America, 2313-K Alcoa Building, Pittsburgh 19, Pa.

ALWAYS USE ALCOA® ALUMINUM ACCESSORIES WITH ALUMINUM CONDUCTORS!

STATISTICS

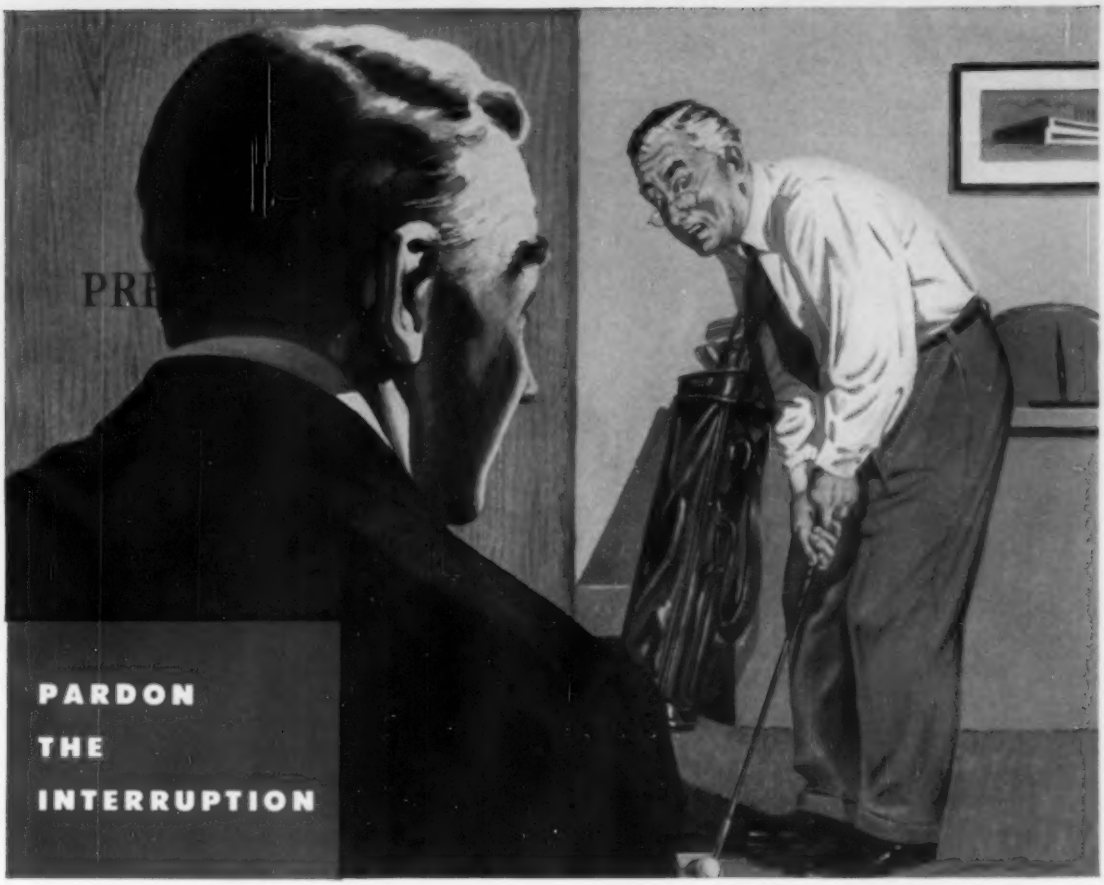


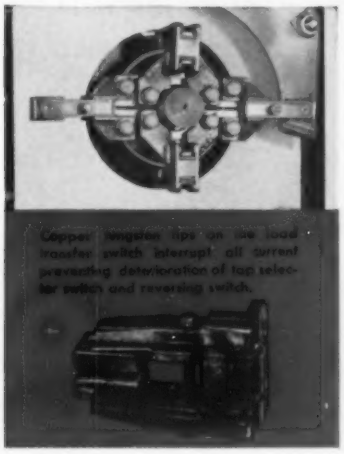
Power Statistics . . .

		Latest Month	Preceding Month	Year Ago	Annual Change %
Capacity	Aug.	110.03	108.79	98.0	12.2
Peak—Class I Systems . . million kw	July	89.3	86.6	78.2	14.2
Estimated Dec. '55 Peak	July	96.3	96.6	96.1	0.2
Production—billion kwhr	Aug.	49.35	46.63	41.17	19.8
Hydro		9.53	9.35	8.34	14.3
Fuel		39.82	37.28	32.82	21.2
Sales—billion kwhr	July	40.89	40.17	35.01	16.8
Residential		9.89	9.57	9.11	8.5
Commercial		6.92	6.48	6.40	8.0
Industrial		21.50	21.75	16.97	26.7
Other		2.59	2.38	2.51	2.9
Fuel Consumption	July				
Coal—million tons		11.72	11.07	9.41	24.5
Oil—million barrels		4.62	4.69	4.44	3.9
Gas—billion cu ft		126.25	107.42	128.36	−1.6
Net Income Class A & B Co's—$ million	July	89.87	96.75	83.84	7.2
Residential Customers—millions	12 mos.	43.83	43.74	42.57	3.0
Revenue per kwhr	ended	2.66¢	2.67¢	2.71¢	−1.9
Avg kwhr per customer	July	2,662	2,649	2,459	8.3
Avg annual bill		$70.81	$70.73	$66.64	6.3

Business Statistics . . .

Indexes: 1947–49 = 100					
FRB Industrial Production	Sept.	141	139	126	11.9
ENR Construction Cost	Sept.	141.0	141.0	134.3	5.0
BLS Cost-of-living	Aug.	114.5	114.7	115.0	−0.4
NEMA Sales	July				
Insulation materials		117	158	92	27.2
Electric appliances		97	122	88	10.2
Household refrigerators		89	105	93	−4.3
Wholesale prices	Aug.				
Motors and generators		121.5	121.5	123.1	−1.3
Transformers and regulators		127.3	127.3	128.1	−0.6
Switchgear and fuses		139.2	135.5	135.1	3.0
GNP—annual rate—$ billion	2nd Qtr.	$385.0	$375.3	$357.6	7.1




Copper tungsten tips on the load transfer switch interrupt all current preventing deterioration of tap selector switch and reversing switch.

Interrupting electricity is just like interrupting the boss. No matter how you do it, it's a touchy situation. Electricity, when interrupted, presents a touchy situation, too!

Yet the primary function of Moloney Load Tap Changing Transformers is interrupting . . . switching to various taps . . . and the load tap changing equipment must bear fully the brunt of the destructive power unleashed with each break in current flow.

That's why Moloney uses switch contacts . . . for all current interrupting duty . . . made of a combination of copper and tungsten that conducts electricity best while successfully resisting arc erosion.

All this, plus the minimum arcing duty required of Moloney load tap changing equipment means greater durability, longer life and overall transformer dependability . . . for your utility system.

Specify Moloney . . . Get Dependability at its Best.

M555-47

MOLONEY ELECTRIC COMPANY

Power Transformers • Distribution Transformers • Load Tap Changing Transformers • Regulating Transformers • Step Voltage Regulators • Primary Unit Substations • Secondary Unit Substation Transformers • Network Transformers • Series Street Lighting Transformers • Subway Transformers • Industrial Dry Type Transformers • Capacitors • Magnetic Components for Electronics

MOLONEY ELECTRIC

SALES OFFICES IN ALL PRINCIPAL CITIES • FACTORIES AT ST. LOUIS 20, MO. AND TORONTO, ONT., CANADA

Through 500 KVA

PROOF of Insulation Quality

on all Allis-Chalmers distribution transformers through 500 kva, 69 kv and below is now shown on every unit. The "Impulse Tested" Seal is put on to show that each unit has been checked with the most modern impulse testing equipment and techniques known to the industry.

Production-line impulse testing was initiated by Allis-Chalmers eight years ago for pole-type units. Now these tests that assure insulation quality are made on every distribution transformer shipped by Allis-Chalmers, including both conventional and self-protected units.

Tests are made without lightning arresters. Allis-Chalmers checks the transformer, not the lightning arrester.

Get the facts about these and other Allis-Chalmers tests and manufacturing procedures that result in distribution transformers of the highest quality. Call the A-C office nearest you, or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin. A-4851

EVERY Allis-Chalmers Distribution Transformer gets this test of Quality

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